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FINAL ECOLOGICAL RISK ASSESSMENT

VOLUME I
Text, Tables, Figures, Appendices A through D

AVTEX FIBERS SITE
FRONT ROYAL, WARREN COUNTY, VIRGINIA

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1.0 INTRODUCTION

1.1 Site Background

Avtex Fibers is located in Front Royal, VA (Figure 1). It was a former rayon, polyester, and polypropylene processing facility. Rayon fibers were produced from 1940 until the plant closed in 1989; polyester was manufactured from 1970 to 1977; and polypropylene was manufactured from 1985 to 1989. Residential areas border the site to the south and the east, General Chemical borders the site to the northeast, and the South Fork of the Shenandoah River borders the site to the north and west. The facility occupies approximately 440 acres (Figure 2).

Raw materials associated with rayon manufacturing include crumb (high-purity alkali cellulose), xanthate [crumb/carbon disulfide (CS_2) mixture], viscose (liquid resulting from dissolving cellulose xanthate in sodium hydroxide), sodium hydroxide, CS_2, ethylene diamine, phenol, sulfuric acid, zinc salts, sodium sulfate, and sodium hypochlorite. The facility has a total of 23 separate land disposal impoundments that have received three types of waste. The first type of waste was spent viscose, which was disposed in on-site basins. The second type was spent acid. The acid was treated with lime and the resultant zinc hydroxide was precipitated and disposed in Sulfate Basins. The third type was fly ash and boiler room solids, which were disposed on site.

Elevated levels of CS_2, hydrogen sulfide (H_2S), arsenic (As), cadmium (Cd), and lead (Pb) have been measured in on-site and off-site groundwater. In addition, polychlorinated biphenyl (PCB) contaminated soils and sediments have been identified. The PCB contamination is partly due to the explosion of an electrical transformer adjacent to the power plant, and to the operation of PCB-containing equipment in the polyester drying area.

Following the plant shutdown in 1989, the U.S. Environmental Protection Agency (U.S. EPA) began its initial emergency response action that lasted two years. Actions included maintaining the water levels in the viscose and sulfate basins through the use of an on-site wastewater treatment plant (WWTP), stabilizing and removing bulk chemicals, neutralizing process system acids, decommissioning the CS_2 tanks and impoundments, consolidating 3,000 drums, and stabilizing the PCB-contaminated loading dock and surrounding soils.

The first phase of field work for the Remedial Investigation (RI) was conducted from June 1993 through April 1994 (ERM 1994a, 1994b). During this investigation, 159 borings, 91 surface samples, and 90 ground water monitoring wells were completed, and over 830 samples were analyzed. These analytical results were used to prepare a preliminary risk assessment.

During the preliminary risk assessment, the maximum concentration of contaminants from each of the five management units was compared to the U.S. EPA Region III benchmarks compiled by the U.S. EPA Region III Biological Technical Assistance Group (BTAG). This process was used to highlight those chemicals which needed further evaluation to determine their risk. The result of this process allowed for the identification of contaminants of concern (COCs) for the Avtex Fibers site. The conclusions of the preliminary risk assessment indicated that 1) additional site specific data were necessary, 2) several assessment endpoints were required, and 3) a baseline risk assessment was necessary for both on-site and river areas.

This report details the process and results of the data collection effort and the development of a baseline risk assessment for the Avtex Fibers site.

1.2 Purpose

The purpose of this effort is to conduct a baseline risk assessment using data collected during a field effort from 11 to 15 May 1997. A quality assurance work plan (QAWP) was prepared, based on the data gaps identified by the preliminary risk assessment, and it outlined the numbers and the types of samples necessary for collection (U.S. EPA 1997) to satisfy a baseline risk assessment. Sediment, soil, water, and tissue samples were collected and analyzed for the contaminants of concern. The results of these analyses were used to determine the risk to biota using the site.

2.0 PROBLEM FORMULATION

This risk assessment was designed to evaluate the potential threats to ecological receptors from exposure to site contaminants. The development of this risk assessment followed the guidance established in the *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (U.S. EPA 1997). During the preliminary risk assessment, the problem formulation process included the identification of COCs through a comparison of the maximum concentration of COCs with accepted benchmarks. This information was then used to identify complete exposure pathways of compounds exceeding benchmarks to ecological receptors and their appropriate measurement endpoints.

The first step of the preliminary risk assessment process compared all chemicals analyzed from previous studies in each of the five units to established benchmarks. Benchmarks for sediment and soil were used to identify potential contaminants of concern for the protection of aquatic biota (U.S. EPA 1995, Long and Morgan 1990, Long et al. 1995, Persuad et al. 1992, U.S. EPA 1992, Suter and Mabrey 1994). Compounds exceeding benchmarks were retained for further evaluation. Based on the results of the preliminary risk assessment, a QAWP was developed which identified the types and numbers of samples that needed to be collected to complete a baseline ecological risk assessment.

2.1 Preliminary Ecological Risk Assessment

A preliminary ecological risk assessment was written to determine the risk associated with the exposure of biota to site-related contaminants. The following steps were completed for the preliminary risk assessment:

(1) A literature search was conducted to locate life history information for selected indicator species, to determine ecotoxicological effects of site contaminants, and to locate bioconcentration factors for site contaminants.

(2) A preliminary ecological risk assessment was prepared to evaluate the potential risk to ecological receptors. This assessment consisted of the following:

- Exposure scenarios were determined based on site contaminant levels, the extent and magnitude of contamination, and the toxicological mechanisms of the contaminants.

- Indicator species were selected based on species present and/or potentially present on site, the availability of toxicity information from the literature, and the potential for exposure to site contaminants based on habitat use or behavior.

- Exposure pathway(s) were determined for each indicator species.

- Exposure and effect profiles were written for each indicator species and each site contaminant.

- A risk characterization was conducted which involved the calculation of hazard quotients (HQs) for each species for a range of exposure scenarios.

Based on the results of the preliminary risk assessment, the COCs were identified in each of the management units. In addition, a set of data requirements was established for each of the assessment endpoints. These data requirements comprise the additional data that was necessary to complete a baseline risk assessment.

Based on the preliminary risk assessment, it was concluded that potential ecological risks exist at the site based on the contaminants evaluated. Metals, polynuclear aromatic hydrocarbons (PAHs), PCBs, and CS_2 posed a risk to all receptors used in the preliminary risk assessment for at least one of the five management units.

2.2 Data Gaps

As part of this evaluation, a preliminary ecological risk assessment was prepared using existing sediment, soil, and water data. The results of the preliminary risk assessment indicated that additional site-specific data was necessary to complete a baseline risk assessment. The preliminary risk assessment was used to identify the contaminants of concern in each of the five site management units. The baseline risk assessment will evaluate the chemicals identified in the preliminary risk assessment which caused potential risk. For the purposes of the baseline risk assessment, the site will be separated into three areas, the (1) on-site basins and the associated sediment, (2) on-site soils, and (3) the river. The biological testing and sampling described next will provide enough sample overlap and information to determine the impacts from all the site areas (fly ash basins, sulfate basins, viscose basins, and other on-site areas).

Seven assessment endpoints were developed to evaluate the risk of contaminants at the Avtex Fibers site. Each of the assessment endpoints is listed in Section 2.6 followed by a general overview of the tests necessary to provide sufficient information to address the assessment endpoint. The measurement endpoints involve tissue samples to determine site-specific bioaccumulation, toxicity testing of site soil and sediment, and food chain modeling using receptor species from the terrestrial and aquatic ecosystems. The indicators of the viability of terrestrial and aquatic populations are reproductive effects and organism survivability.

2.3 Identification of the Contaminants of Concern

The contaminants of potential concern were identified using the results presented in the draft RI and the preliminary risk assessment. The COCs for this site that were retained through the preliminary risk assessment include the metals, PCBs PAHs, and CS_2.

2.4 Exposure Characterization

The objective of the exposure assessment is to determine the pathways and media through which receptors may be exposed to site contaminants. Potential exposure pathways are dependant on habitats and receptors present on site, extent and magnitude of contamination, and environmental fate and transport of COCs.

Areas of concern include the disposal areas (e.g, fly ash pile and basins, sulfate basins, viscose basins) and the river. As a result of industrial activities at the Avtex Fibers Site, CS_2, PAHs, PCBs, and metals have accumulated in site soils and sediments. In the baseline ecological risk assessment, it will be concluded that "a potential risk" exists if the HQ calculated from the mean area concentration and the No Observed Apparent Effect Level (NOAEL) equals or exceeds 1.

2.5 Hazard Characterization/Toxicity Assessment

To determine the effects of contaminants on biota, it is necessary to understand the mechanisms of toxicity of the chemicals and the systems that they affect. Knowledge of the fate, effects, and mode of action of the COCs allows for the selection of appropriate assessment endpoints. A discussion of metal, PAHs, PCBs, and CS_2 toxicity is presented next. It should be noted that the HQs (from the preliminary risk assessment) for several isolated chemicals also exceeded 1 [e.g., volatile organic compounds (VOCs) in the fly-ash piles and sulfate basins, pesticides in the river and on-site areas, and base, neutral, and acid extractable compounds (BNAs) in the fly ash piles]. However, toxicity profiles were not prepared for these individual compounds. It is anticipated that the site specific studies described in the baseline risk assessment will be used to determine if these compounds pose a problem to biota inhabiting the site.

2.5.1 Arsenic

Several review articles are available which discuss the toxic effects of As (Eisler 1988a, Nriagu 1994). Arsenic tends to be widespread in the environment (Woolson 1975) and is constantly being oxidized, reduced, or mobilized (Eisler 1988a). Physical processes are important in determining As bioavailability in aquatic environments. For example, arsenates are readily adsorbed onto sediments with high organic matter, and arsenates are more strongly adsorbed onto sediments than other As forms. However, absorption depends on the As concentration, sediment characteristics, pH, and ionic concentration of other compounds (Eisler 1988a; U.S. EPA 1981). The U.S. EPA (1981) noted that arsenate (pentavalent) is the predominant As form in oxygenated water and that arsenite (trivalent) is the predominant As form in anaerobic conditions.

Arsenic is not significantly concentrated in aquatic invertebrates; whole body concentration factors for invertebrates range from 3 to 17 for exposure to arsenic trioxide (trivalent) and from 0 to 7 for arsenic pentoxide (pentavalent). Arsenic may be bioconcentrated by organisms at the bottom of the food chain; however, data do not indicate that significant biomagnification occurs (U.S. EPA 1985).

2.5.2 Cadmium

Tissue levels of Cd increase with the age of an organism and eventually act as a cumulative poison (Hammons et al. 1978). Cadmium replaces essential metals (e.g., zinc) at critical sites on proteins and enzymes, and may inhibit a variety of enzymatic reactions. It inhibits Phase I and Phase II biotransformation reactions, probably by alteration of the enzymes responsible for these reactions (Sipes and Gandolfi 1986). Cytochrome P-450 monoxygenases play a major role in Phase I reactions. Cadmium also combines with sulfhydryl groups in enzymes, which affects the transfer of electrons from compounds in the citric acid cycle to compounds in the electron transport chain. Cadmium can inhibit adenosine triphosphate (ATP) activity in the following ways: it binds to and inactivates enzymes which synthesize ATP, and it binds to ATPase, which is required to convert ATP to ADP + PO_4. (Hammons et al. 1978).

Vertebrates tend to accumulate Cd in the kidney and liver tissue (Eisler 1985). Freshwater aquatic species are most sensitive to toxic effects of Cd, followed by marine organisms, birds, and mammals.

2.5.3 Chromium

Chromium (Cr) can exist in oxidation states ranging from -2 to +6, but is most frequently converted to the relatively stable trivalent (+3) and hexavalent (+6) oxidation states (Eisler 1986a). In both freshwater and marine systems, hydrolysis and precipitation are the most important processes that determine the fate and effects of Cr, whereas adsorption and bioaccumulation are relatively minor. Precipitated Cr^{+3} hydroxides remain in sediments under aerobic conditions. However, under anoxic and low pH conditions, Cr^{+3} hydroxides may solubilize and remain as ionic Cr^{+3} unless oxidized to Cr^{+6} through mixing and aeration (Eisler 1986a). In soils, the solubility and bioavailability of Cr are governed by soil pH and organic complexing substances, although organic complexes play a more significant role (James and Bartlett 1983a; James and Bartlett 1983b).

The trivalent state is the form usually found in biological materials. This form functions as an essential element in mammals by maintaining efficient glucose, lipid, and protein metabolism (Stevens et al. 1976).. Chromium is beneficial but not essential to higher plants (Eisler 1986a). The biomagnification and toxicity of Cr^{+3} is low relative to Cr^{+6} because of its low membrane permeability and its noncorrosivity. However, a large degree of accumulation by aquatic and terrestrial plants and animals in the lower trophic levels has been documented (Eisler 1986a), although, the mechanism of accumulation remains largely unknown.

Chromium is mutagenic, carcinogenic, and teratogenic, with Cr^{+6} exhibiting the greatest toxicity; relatively less is known about the toxicity of Cr^{+3} . At high concentrations, Cr^{+6} is associated with abnormal enzyme activity, altered blood chemistry, lowered resistance to pathogenic organisms, behavioral modifications, disrupted feeding, histopathology, osmoregulatory upset, alterations in population structure, and inhibition of photosynthesis.

Rabbits fed dietary Cr accumulated hyaluronates, chondroitin sulfates, and neutral mucopolysaccharides in the soft tissues, causing pericapillary sclerosis (Kucher and Shabanov 1967). This accumulation blocked blood tissue barriers, which are permeable under normal conditions, preventing the normal transport of metabolites. One manifestation of this condition was the inhibition of insulin production in the pancreatic islets due to damage to the beta-cells contained therein.

Chromium also leads to nephron damage via swelling and loss of microvilli, the formation of intracellular vacuoles, mitochondrial swelling, and cytoplasmic liquefication and loss of cells lining the nephron surface (Evan and Dail 1974).

2.5.4 Copper

Copper is an essential element for animals and is a component of many metalloenzymes and respiratory pigments (Demayo et al. 1982). It is also essential to iron (Fe) utilization and functions in enzymes for energy production, connective tissue formation, and pigmentation (Venugopal and Luckey 1978). Excess Cu ingestion leads to accumulation in tissues, especially in the liver. High levels of Cu modify hepatic metabolism (Brooks 1988), which may lead to inability of the liver to store and excrete additional Cu. When liver concentration exceeds a certain level, the metal is released into the blood, causing hemolysis and jaundice. High Cu levels also inhibit essential metabolic enzymes (Demayo et al. 1982). Toxic symptoms appear when the liver accumulates 3 to 15 times the normal level of Cu (Demayo et al. 1982).

Although the exact mechanism of toxicity is not known, the following mechanisms have been proposed: formation of stable inhibitory complexes with cytochrome P-450 (Wiebel et al. 1971); impairment of function of NADPH-cytochrome c reductase and alteration of mixed function oxidations (Reiners et al. 1986); and inhibition of heme biosynthesis (Martell 1981). Intranuclear inclusions may act as a detoxifying mechanism where Cu is complexed by protein ligands, protecting cytoplasmic organelles (Demayo et al. 1982).

Ruminants are the most sensitive mammal species to Cu toxicosis. Young animals retain more dietary Cu than older animals and are more sensitive to Cu toxicity (Venugopal and Luckey 1978).

2.5.5 Lead

Lead does not biomagnify to a great extent in food chains, although accumulation by plants and animals has been extensively documented (Wixson and Davis 1993, Eisler 1988b). Older organisms typically contain the highest tissue Pb concentrations, with the majority of the accumulation in the bony tissue of vertebrates (Eisler 1988b).

Predicting the accumulation and toxicity of Pb is difficult since its effects are influenced to a very large degree, relative to other metals, by interactions among physical, chemical, and biological variables. In general, organolead compounds are more toxic than inorganic Pb compounds, and young, immature organisms are most susceptible to its effects (Eisler 1988b). In plants, Pb inhibits growth by reducing photosynthetic activity, mitosis, and water absorption. The mechanism by which photosynthetic activity is reduced is attributed to the blocking of sulfhydryl groups, inhibiting the conversion of coproporphyrinogen to proporphyrinogen (Holl and Hampp 1975).

The toxic effects of Pb on aquatic and terrestrial organisms are extremely varied and include mortality, reduced growth and reproductive output, blood chemistry alterations, lesions, and behavioral changes. However, many effects exhibit general trends in their toxic mechanism. Generally, Pb inhibits the formation of heme, adversely affects blood chemistry, and accumulates at hematopoietic organs (Eisler 1988b). At high concentrations near levels causing mortality, marked changes to the central nervous system occur prior to death (Eisler 1988b).

Plants can uptake Pb through surface deposition in rain, dust, and soil, or by uptake through the roots. The ability of a plant to uptake Pb from soils is inversely related to soil pH and organic matter content. Lead can inhibit photosynthesis, plant growth, and water absorption.

2.5.6 Mercury

Mercury (Hg) may be present in the environment in a number of forms. In all inorganic forms, Hg^{2+} is the toxic species. The most toxic and bioavailable forms of Hg are organomercury compounds, which are highly stable and lipophilic, accumulating in food chains. Mercury can become methylated biologically or chemically. Microbial methylation of Hg occurs most rapidly under anaerobic conditions, common in wetlands and aquatic sediments. The majority of Hg detected in biological tissues is present in the form of methylmercury (Huckabee et al. 1979).

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Mercury has no known biological function, and its presence in biological systems appears to result in undesirable effects. All Hg compounds interfere with thiol metabolism in organisms, causing inhibition or inactivation of proteins containing thiol ligands and ultimately leading to mitotic disturbances (Das et al. 1982, Elhassani 1983). Mercury also binds strongly with sulfhydryl groups. Phenyl- and methylmercury compounds are among the strongest known inhibitors of cell division (Birge et al. 1979). In mammals, methylmercury irreversibly destroys the neurons of the central nervous system. Eisler (1987a) reports that juvenile life stages are most susceptible to acute effects of Hg exposure. In fish, acute exposure results in impaired respiration, sluggishness, and loss of equilibrium (Armstrong 1979).

Mercury is a potent neurotoxin, resulting in impaired muscular coordination, weight loss, and apathy in birds, mammals, and fish (Eisler 1987a). Other reported effects include histopathological changes, changes in enzyme activity levels, mutagenicity, teratogenicity, and reproductive impairment. Mercury, especially methylmercury, is known to concentrate in biological tissues and magnify through the food chain.

Mercury can exist in three oxidation states: elemental Hg (Hg^0), mercurous ion (Hg_2^{2+}), and mercuric ion (Hg^{2+}). The mercuric ion is the most toxic inorganic chemical form (Clarkson and Marsh 1982). Methylmercury (MeHg) is the most hazardous form of Hg due to its high stability, its lipid solubility, and ability to penetrate membranes in living organisms (Beijer and Jernalov 1979).

For all organisms tested, early developmental stages were most sensitive to toxic effects of Hg. Organomercury compounds, especially methylmercury, were more toxic than inorganic forms. In aquatic organisms, Hg adversely affects reproduction, growth, behavior, osmoregulation and oxygen exchange. At comparatively low concentrations in birds and mammals, Hg adversely affects growth and development, behavior, motor coordination, vision, hearing, histology, and metabolism. In mammals, the fetus is the most sensitive life stage (Eisler 1987).

2.5.7 Nickel

Pure nickel (Ni) is a hard, white metal that is usually used in the formation of alloys (such as stainless steel). Nickel is found in the environment as oxides or sulfides. Nickel may be released into the environment through mining, oil-burning power plants, coal-burning power plants, and incinerators. Nickel will attach to soil or sediment particles, especially those containing Fe or manganese (Mn). Under acidic conditions, Ni may become more mobile and seep into the groundwater. The typical Ni concentration reported in soils is from 4 - 80 milligrams per kilograms (mg/kg). The speciation and physicochemical state of Ni is important in considering its behavior in the environment and its availability to biota.

2.5.8 Zinc

Zinc (Zn) is essential for normal growth and reproduction in plants and animals and is regulated by metallothioneins. Metallothioneins act as temporary Zn storage sites and aid in reducing the toxicity of Zn to both vertebrates and invertebrates (Olsson et al. 1989). Zinc is not known to magnify in food chains, because it is regulated by the body and excess Zn is eliminated.

Zinc has its primary metabolic effect on Zn-dependant enzymes that regulate the biosynthesis and catabolic rate of ribonucleic (RNA) acid and deoxyribonucleic acid (DNA). High levels of Zn induce Cu deficiency and interfere with metabolism of calcium (Ca) and Fe (Goyer 1986). The pancreas and bone seem to be the primary targets of Zn toxicity in birds and mammals. Pancreatic effects include cytoplasmic vacuolation, cellular atrophy, and cell death (Lu and Combs 1988, Kazacos and Van Vleet 1989). Zinc preferentially accumulates in bone, and induces osteomalacia (a softening of bone caused by a deficiency of Ca, phosphorus and other minerals) (Kaji et al. 1988). Gill epithelium is the primary target site in fish. Zinc toxicosis results in destruction of gill epithelium and tissue hypoxia (Spear 1981).

2.5.9 Polycyclic Aromatic Hydrocarbons

Acute and chronic exposure to carcinogenic PAH compounds is known to result in the destruction of bone marrow and lymphoid tissues, negative gametogenic effects, kidney damage, and changes in intestinal and respiratory epithelia (Lee and Grant 1981; U.S. EPA 1980b). Application of some PAHs to the skin of mammals causes the destruction of sebaceous glands, hyperplasia, hyperkeratosis, and ulceration (U.S. EPA 1980b). Newborn mice exposed to PAHs may die from acute or chronic wasting disease, develop thymomas, and suffer from serious damage to the thymus (U.S. EPA 1980b). PAH compounds have also been associated with oocyte and follicle destruction in mouse ovaries (Ward et al. 1985).

PAH carcinogens generally transform cells by genetic injury. The parent PAH compound is metabolized by the mixed-function oxidase pathway to a reactive intermediate, which can in turn bind with cellular macromolecules (Dipple 1985; Ward et al. 1985). This binding of metabolic intermediate reactive compounds to DNA, RNA, and other cellular proteins is believed to result in cell transformation, and induction of tumors (Eisler 1987b). Difference in species sensitivity to PAH carcinogens is a function of the activity of the mixed-function oxidase pathway. These differences have a direct effect on the rate at which potential cancer causing reactive intermediates are converted into their unreactive forms (Campbell et al. 1983; Miranda and Chlabra 1980; Neff 1979; U.S. EPA 1980b).

The tumorigenic activity of these compounds tends to increase with increasing molecular size (Dipple 1985; Neff 1979; U.S. EPA 1980b). This activity has also been observed to increase with increasing alkyl substitution on the carbon rings of the molecules (Eisler 1987b). However, if alkyl additions are longer than two carbon chains, the tumorigenic activity decreases (Eisler 1987b). This decrease is presumably due to size-limited PAH compound transport across cell membranes (Eisler 1987b). It appears that unsubstituted PAH compounds do not accumulate in mammal adipose tissue even though they are highly lipid soluble. This is probably due to their rapid metabolism (U.S. EPA 1980b).

Another consideration in PAH toxicity to mammals is that many chemicals (including other PAHs) are known to modulate the action of carcinogenic PAHs (Eisler 1987b). This alteration occurs in one of three main pathways. The first major pathway occurs when the addition of a second chemical decreases the activation (increases detoxification) of the carcinogenic PAH. A second pathways occurs when the chemical binds to the carcinogenic PAH, preventing it from reaching key targets in the cell such as DNA. The third pathway is competitive antagonism between the two chemicals (DiGiovanni and Slaga 1981). In most situations where environmental PAH pollution is observed, the PAHs are present in complex mixtures that vary from one sampling site to the next. Understanding the toxicity of PAHs is extremely difficult under normal field

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conditions.

2.5.10 Polychlorinated Biphenyls

A variety of PCB-induced toxic effects have been observed in mammals. Mink are particularly sensitive to dietary PCB levels (Aulerich et al. 1985). Anorexia, weight loss, lethargy, enlarged livers, and intestinal discharge of blood have been noted in exposed mink (Eisler 1986b). Placental and mammary transfer of PCB has been shown to be a direct route of PCBs between mother and young. PCB exposure can lead to behavioral disorders, specifically in sleep/wake cycles, and in animals that hibernate or aestivate (Montz et al. 1982; Sanders and Kirkpatrick 1977). Negative effects of PCBs on metabolism, thyroid control, ATPase activity, oxidative phosphorylation, steroid hormone activity, immunity, and vitamin A pathways have been noted (Safe 1984; U.S.EPA 1980a).

PCB toxicity in mammals is highly variable. While some PCBs are extremely toxic, and can produce death and cause reproductive failure in very low levels, others appear to produce few, if any, toxic responses (Eisler 1986b). Toxic responses to PCBs are highly species specific. Mink are highly susceptible to PCB toxicity, while closely related mammals, such as the European ferret, are more resistant (Eisler 1986b). Younger mammals appear to be more susceptible to PCB poisoning than adults (Eisler 1986b) Mutagenic, carcinogenic, and teratogenic effects of PCB exposure have been observed, with mutagenic activity appearing to increase with increasing chlorination of the PCB molecule (Eisler 1986b).

As with mammals, there is also a great degree of variability among different bird species in response to PCBs. In sensitive species, normal patterns of growth, behavior, reproduction, and metabolism may be altered. Liver concentrations of PCBs are generally highest in piscivorous birds, followed by birds that feed on other smalls bird and mammals, birds that feed on worms and insects, and herbivorous or seed eating birds, respectively (NAS 1979).

2.5.11 Carbon Disulfide

Impure CS_2 is a yellowish liquid with an unpleasant odor. It evaporates at room temperature and is heavier than air. Carbon disulfide is used in the production of rayon, cellophane, and carbon tetrachloride and is used to solubilize fats, rubber, phosphorus, and sulfur. The release of CS_2 into surface waters (in an effluent stream) is likely to partition into the atmosphere as the result of a high ratio of vapor pressure to solubility. In addition, CS_2 is not expected to adsorb to sediment due to its low K_{oc} value. However, because of its low affinity for soil, it may be transported into groundwater from spills.

Carbon disulfide is rapidly absorbed via inhalation, oral, and dermal routes. It is then distributed throughout the body. Because of its lipophilic nature, it is distributed in organs such as the brain and liver. This compound reaches equilibrium rapidly across a wide range of doses and exposure durations.

The primary impact of CS_2 exposure is to the nervous system. Neuro-physiological and behavioral effects have been reported in both humans and animals exposed to CS_2. There is no definitive evidence that this compound causes cancer (in humans) (ATSDR 1985).

2.6 Selection of Assessment Endpoints

Previous data collected at the site, the preliminary risk assessment, and a site reconnaissance allowed for the selection of assessment endpoints that corresponded to the habitat types present at the Avtex Fibers Site. The site is composed of a variety of habitats including forested and old-field uplands, wetlands, basins, and the river. A variety of birds, mammals, and fish may use the site for feeding and nesting. Therefore, the assessment endpoints focused toward these faunal groups. Viability of terrestrial, avian, and aquatic populations and organism survivability were selected as assessment endpoints for this risk assessment. Listed next are the specific assessment endpoints selected for this ecological risk assessment.

Seven assessment endpoints were chosen to evaluate the risk of exposure to contaminants at the Avtex Fibers site:

1) protection of benthic invertebrate communities to maintain species diversity and nutrient cycling (trophic structure), to provide a food source for higher level consumers, and to insure that contaminant levels in benthic invertebrate tissues are low enough to minimize the risk of bioaccumulation and/or other negative toxic effects in higher trophic levels.

2) protection of fish communities to insure that exposure to and ingestion of contaminants by forage fish does not have a negative impact on growth, survival, and reproductive success of forage fish species. Additionally, to insure that contaminant levels accumulated in forage fish tissues are low enough to minimize the risk of accumulation and negative effect in higher trophic levels.

3) protection of piscivorous birds to insure that ingestion of contaminants in forage fish does not have a negative impact on growth, survival, and reproductive success.

4) protection of worm-eating birds to insure that ingestion of contaminants in earthworms does not have a negative impact on growth, survival, and reproductive success. The second part of this assessment endpoint is to insure that the accumulation of contaminants in soil invertebrates (earthworms) does not have a negative impact on growth, survival, and reproductive success of soil invertebrates.

5) protection of carnivorous birds to insure that ingestion of contaminants in prey does not have a negative impact on growth, survival, and reproductive success.

6) protection of carnivorous mammals to insure that ingestion of contaminants in prey does not have a negative impact on growth, survival, and reproductive success.

7) protection of omnivorous mammals to insure that ingestion of contaminants in forage does not have a negative impact on growth, survival, and reproductive success, to provide a food source for higher level consumers, and to insure that contaminant levels in omnivore tissues are low enough to minimize the risk of bioaccumulation and/or other negative toxic effects in higher trophic levels.

2.7 Production of Testable Hypotheses

The testable hypotheses are specific risk questions that are based on the assessment endpoints. Based on the mechanism of contaminant toxicity, the number of complete exposure pathways that may exist for an assessment endpoint, or other factors, there may be more than one question for each assessment endpoint.

Are levels of site contaminants in sediment (from the basins and the river) sufficient to cause adverse alterations to the structure and/or function of the benthic community, at either the population or community level? In addition, are tissue concentrations of contaminants sufficient to cause alterations in the structure and/or function of the benthic community?

Are levels of site contaminants in sediment sufficient to cause adverse effects on the fishery resources that utilize the site? In addition, are the tissue concentrations of contaminants sufficient to cause alterations in the structure and/or function of the fisheries community?

Are levels of site contaminants in sediment and forage fish (from the basins and the river) sufficient to cause adverse effects on the long-term health and reproductive capacity of piscivorous birds that utilize the site?

Are levels of site contaminants in soil and forage (earthworms) sufficient to cause adverse effects on the long-term health and reproductive capacity of worm-eating birds that utilize the site? The second part of this hypothesis is to determine if the levels of site contaminants in soil are sufficient to cause adverse effects on the health and reproductive capacity of soil invertebrates (earthworms).

Are levels of site contaminants in soil and forage (small mammals) sufficient to cause adverse effects on the long-term health and reproductive capacity of carnivorous birds that utilize the site?

Are levels of site contaminants in soil and forage (small mammals) sufficient to cause adverse effects on the long-term health and reproductive capacity of carnivorous mammals (e.g., red fox) that utilize the site? In addition, are levels of site contaminants in sediment and forage (fish and small mammals) sufficient to cause adverse effects on the long-term health and reproductive capacity of carnivorous mammals (e.g., mink) that utilize the site?

Are levels of site contaminants in sediment and forage (clams and fish) sufficient to cause adverse effects on the long-term health and reproductive capacity of omnivorous mammals (e.g., raccoon) utilizing the site? In addition, are tissue concentrations of contaminants sufficient to cause alterations in the structure and/or function of the mammal community?

2.8 Lines of Evidence

As stated previously, assessment endpoints may have more than one measurement endpoint. For those assessment endpoints having multiple measurement endpoints, a weight-of-evidence approach allows the results of the measurement endpoints to be integrated into a single conclusion. A weight-of-evidence evaluation implies that there are multiple lines-of-evidence, but not all lines-of-evidence have equal strength. When multiple lines-of-evidence for a particular assessment endpoint lead to the same conclusion, there is an implied weighing and the level of confidence increases in the risk estimate. If multiple lines generate apparent conflicts, then the weights relative to the mechanisms of toxicity will be used in evaluating the level of confidence in the risk estimate. For this risk assessment, the following lines-of-evidence (in order of increasing relative strength) were identified:

For assessment endpoint 1, protection of the benthic invertebrate community structure and function, there are three lines of evidence:

1) comparison of the tissue concentrations (fingernail clams) with indicators of organism health
2) toxicity test results [amphipod and chironomid (in both the basins and the river sediment; daphnid for the basin water)]

3) evaluation of the benthic macroinvertebrate population/community structure

For assessment endpoint 2, protection of the fish populations and communities from direct toxicity and reproductive impairment, there are four lines of evidence:

1) comparison of the sediment concentration to literature-based effects levels
2) food chain exposure models [ingestion of forage fish (redbreast sunfish) by a carnivorous fish (smallmouth bass)]
3) comparison of the tissue concentration to literature-based effect levels [tissue concentrations in redbreast sunfish (the river) and carp (on-site basins)]
4) toxicity tests [fathead minnow (in the basins)]

For assessment endpoint 3, protection from direct toxicity effects and reproductive impairment of piscivorous birds utilizing the site, there is one line of evidence:

1) food chain exposure model [ingestion of a forage fish (redbreast sunfish or carp) by a piscivorous bird (kingfisher)]

For assessment endpoint 4, protection from direct toxicity effects and reproductive impairment of worm-eating birds utilizing the site, there is one line of evidence:

1) food chain exposure model [ingestion of soil invertebrates (earthworms) by a carnivorous bird (woodcock)]

Additionally, for assessment endpoint 4, protection from direct toxicity effects and reproductive impairment of the terrestrial invertebrate population, there are three lines of evidence:

1) comparison of the soil concentration to literature-based effect levels
2) comparison of the tissue concentration to literature based effect levels (tissue concentrations in earthworm)
3) toxicity tests (earthworm exposure to soil)

For assessment endpoint 5, protection from direct toxicity effects and reproductive impairment of carnivorous birds utilizing the site, there is one line of evidence:

1) food chain exposure model [ingestion of small mammals by a carnivorous bird (red-tailed hawk)]

For assessment endpoint 6, protection from direct toxicity effects and reproductive impairment of carnivorous mammals utilizing the site, there is one line of evidence:

1) food chain exposure model [ingestion of small mammals by carnivorous mammal (red fox) and ingestion of fish/small mammals by a piscivorous mammal (mink)]

For assessment endpoint 7, protection from direct toxicity effects and reproductive impairment of omnivorous mammals utilizing the site, there are three lines of evidence:

1) comparison of the sediment (or soil) concentration to literature-based effects levels
2) comparison of the tissue concentrations (small mammals) with indicators of organism health
3) food chain exposure model [ingestion of clams and fish by an omnivorous mammal (raccoon)]

2.9 Conceptual Model

The conceptual model relies on contaminant and habitat characteristics to identify critical exposure pathways to the selected assessment endpoints. For example, contaminants in the soil may come in contact with subsurface (earthworms) and above-ground terrestrial receptors (small mammals) inhabiting the wooded, wetland, and open field areas of the site. Subsurface terrestrial receptors in these areas may be exposed to site contaminants through direct contact with the soil, and in some cases, the intentional ingestion of soil. Above-ground terrestrial receptors may be exposed to contaminants through direct contact with the soil, the ingestion of subsurface terrestrial organisms, the ingestion of other above-ground terrestrial receptors, the incidental ingestion of soil adhered to food items, and the intentional ingestion of surface water from any of the on-site surface drainages or open water bodies.

Listed below are the pathways that are evaluated in this risk assessment.

I. Benthic invertebrates
- a) Direct exposure to sediment
- b) Direct exposure to water

II. Soil Invertebrates
- a) Direct exposure to soil

II. Forage fish
- a) Direct exposure to water
- b) Direct exposure to sediment

IV. Carnivorous fish
- a) Ingestion of forage fish
- b) Incidental ingestion of sediment

V. Piscivorous bird
- a) Ingestion of forage fish
- b) Incidental ingestion of sediment
- c) Incidental ingestion of water

VI. Worm-eating bird
- a) Ingestion of earthworms
- b) Incidental ingestion of soil

VII. Carnivorous bird
- a) Ingestion of small mammals
- b) Incidental ingestion of soil

VIII. Carnivorous mammal
- a) Ingestion of small mammals
- b) Incidental ingestion of soil

IX. Omnivorous mammal
- a) Ingestion of forage fish
- b) Ingestion of clams
- c) Incidental ingestion of sediment
- d) Incidental ingestion of water

X. Piscivorous mammal
   a) Ingestion of forage fish
   b) Incidental ingestion of sediment
   c) Incidental ingestion of water

2.10 Selection of Measurement Endpoints

Measurement endpoints are "measurable ecological characteristics that are related to the valued characteristics selected as assessment endpoints. Measurement endpoints should be linked to the assessment endpoints by the mechanism of toxicity and the route of exposure (e.g., the conceptual model). Measurement endpoints are used to derive a quantitative estimate of potential effects, and form a basis for extrapolation to the assessment endpoints (U.S. EPA 1997)."

Measurement endpoints were selected on the basis of potential presence of receptors on site, and the potential for exposure to contaminants of concern. The availability of appropriate toxicity information on which risk calculations could be based was also an important consideration. Endpoints selected were determined to be representative of exposure pathways and assessment endpoints identified for the site.

Next is a list of specific measurement endpoints that correspond to the assessment endpoints identified in Section 2.6.

Assessment Endpoint No. 1 - Protection of benthic invertebrate communities to maintain species diversity and nutrient cycling (trophic structure), to provide a food source for higher level consumers, and to insure that contaminant levels in benthic invertebrate tissues are low enough to minimize the risk of bioaccumulation and/or other negative toxic effects in higher trophic levels.

Measurement Endpoints

To evaluate the structure and function of the benthic community, benthic macroinvertebrates were collected from six locations on the Shenandoah River. Colocated sediment samples were also collected and analyzed for target analyte list (TAL) metals, PCBs, VOCs, grain size, and total organic carbon (TOC). The results of these tests will be used to partially satisfy the objectives of Assessment Endpoint 1.

In addition, sediment was collected from each of these locations and tested using the amphipod, *Hyallela azteca* and chironomid, *Chironomus tentans* toxicity tests. The endpoints of these tests will be survival and growth. Sediment samples for toxicity testing were also collected from several of the on-site basins (e.g., Sulfate Basins and Fly Ash Basins). The results of these tests will be used to partially satisfy the objectives of this assessment endpoint.

Fingernail clams (Sphaeridae) were collected from each of the benthic macroinvertebrate stations. The tissue (soft tissue only) was analyzed for metals and PCBs. The concentration of contaminants in the tissue will be compared to literature values associated with adverse effects in order to partially satisfy the objectives of Assessment Endpoint 1.

Lastly, to determine the toxicity of the water in the on-site basins, toxicity tests were run using a cladoceran, *Ceriodaphnia dubia*. The endpoints of these tests are survival and reproductive success.

Assessment Endpoint No. 2 - Protection of fish communities to insure that ingestion of contaminants by forage fish does not have a negative impact on growth, survival, and reproductive success of forage fish. Additionally, to insure that contaminant levels accumulated in fish tissues are low enough to minimize the risk of accumulation and negative effect in higher trophic levels.

Measurement Endpoints

Fishery resources that utilize the site can be impacted by contaminants in two ways: short-term toxicity to larvae and juveniles utilizing the site; and long-term reproductive effects on organisms exposed to contaminants as larvae or juveniles. The selected measurement endpoint receptor species is the smallmouth bass. Levels of contaminants measured in sediment and forage fish (redbreast sunfish, *Lepomis auritus*) will be used in ingestion-based food accumulation models to determine the dose to the smallmouth bass, *Micropterus dolomieu* and compared to a literature based LOAEL value to generate a Hazard Quotient.

Redbreast sunfish were collected from five locations within the South Fork of the Shenandoah River (Figure 2). The fish were analyzed for TAL metals and pesticides/PCBs (pest/PCBs). The results of the tissue analysis will be compared to literature values to determine the effects to fish using the river. In addition, carp were collected from Sulfate Basin No. 5. These fish were analyzed for TAL metals, and Pest/PCBs. The results of these tissue concentrations will be used to determine risk to the fish by comparison to literature values.

Fathead minnow, *Pimephales promelas*, toxicity tests were used to determine the toxicity of the water in the on-site basins. The endpoints of these tests were survival and growth.

Assessment Endpoint No. 3 -Protection of piscivorous birds to insure that exposure to contaminant concentrations present in forage fish does not have a negative impact on growth, survival, and reproductive success.

Measurement Endpoints

A food chain accumulation model was selected to evaluate the risk to avian species which use the site as a feeding area. The selected measurement endpoint receptor species is the belted kingfisher, *Megaceryle alcyon*. Appropriate forage species [redbreast sunfish (for the river) and carp (for the basins)] were identified as prey for the kingfisher. A dietary dose will be calculated based on the ingestion of sunfish or carp. The resulting dose will be compared to existing toxicity data for the kingfisher or a closely related species and a hazard quotient calculated.

Assessment Endpoint No. 4 - Protection of worm-eating birds to insure that ingestion of contaminants in earthworms does not have a negative impact on growth, survival, and reproductive success. The second part of this assessment endpoint is to insure that the accumulation of contaminants in soil invertebrates (earthworms) does not have a negative impact on growth, survival, and reproductive success of soil invertebrates.

Measurement Endpoints

A food chain accumulation model was selected to evaluate the risk to worm-eating birds that use the site as a feeding area. The selected measurement endpoint receptor species is the American woodcock, *Scolopax minor*. Appropriate forage species (earthworms) were identified as prey for the woodcock. A dietary dose will be calculated based on the ingestion of worms. The resulting dose will be compared to existing toxicity data for the woodcock or closely related species and a hazard quotient calculated.

Earthworm toxicity tests were used to determine the effects of exposure to site soils on the forage base. The endpoint of the tests were survival and growth. In addition, at the completion of the test, the worms will be analyzed for TAL metals and PCBs. The concentration of these contaminants will be used to calculated a dose to the woodcock.

Assessment Endpoint No. 5 - Protection of carnivorous birds to insure that ingestion of contaminants in prey does not have a negative impact on growth, survival, and reproductive success.

Measurement Endpoints

A food chain accumulation model was selected to evaluate risk to carnivorous birds that use the site as a feeding area. The selected measurement endpoint receptor species is the red-tailed hawk, *Buteo jamaciensis*. Appropriate forage species (small mammals) were identified as prey for the hawk. A dietary dose will be calculated based on the ingestion of small mammals. The resulting dose will be compared to existing toxicity data for the hawk or closely related species and a hazard quotient calculated.

Assessment Endpoint No. 6 - Protection of carnivorous mammals to insure that ingestion of contaminants in prey does not have a negative impact on growth, survival, and reproductive success.

Measurement Endpoints

A food chain accumulation model was selected to evaluate risk to carnivorous mammals that use the site. The selected measurement endpoint receptor species are the mink, *Mustela vison*, (as a model for a piscivorous mammal) and the red fox, *Vulpes vulpes*, (as a model for carnivorous mammal). Appropriate forage species (small mammals and fish) were identified as prey for the above receptors. A dietary dose will be calculated based on the ingestion of small mammals or fish. The resulting dose will be compared to existing toxicity data and a hazard quotient calculated.

Assessment Endpoint No. 7 - Protection of omnivorous mammals to insure that ingestion of contaminants in forage does not have a negative impact on growth, survival, and reproductive success, to provide a food source for higher level consumers, and to insure that contaminant levels in omnivore tissues are low enough to minimize the risk of bioaccumulation and/or other negative toxic effects in higher trophic levels.

Measurement Endpoints

A food chain accumulation model was selected to evaluate risk to omnivorous mammals that use the site. The selected measurement endpoint receptor species is the raccoon, *Procyon lotor*. Appropriate forage species (fish and clams) were identified as prey for the raccoon. A dietary dose will be calculated based on the ingestion of clams and fish. The resulting dose will be compared to existing toxicity information and a hazard quotient calculated.

In addition, the tissue concentrations in the small mammals will be compared to literature values to determine the risk to small mammals collected on the site.

2.11 Life History/Exposure Profile Information

Receptor species were selected from several trophic levels. Organisms which were likely to be exposed to contaminants because of specific behaviors, patterns of habitat use, or feeding habits were selected for evaluation in this risk assessment. The availability of appropriate toxicity information on which risk calculations could be based was also an important consideration. The terrestrial invertebrate receptor selected for this assessment is the earthworm. The terrestrial vertebrate receptor species selected for this risk assessment are: mink, red fox, and raccoon. The avian receptor species selected for this risk assessment are: American woodcock, red-tailed hawk, and belted kingfisher. The aquatic vertebrate receptor species for this risk assessment are: fathead minnow, redbreast sunfish, carp, and smallmouth bass. The aquatic invertebrate receptors include *C. dubia* to determine the exposure to water-borne contaminants and *H. azteca*, *C. tentans*, and fingernail clam to determine the exposure to sediment-sorbed contaminants. These species were selected due to their presence on-site, their importance in the food chain, or their habitat location on or near the site. The information presented in the following profiles will be used in the food chain accumulation models.

2.11.1 Earthworm (*Eisenia foetida*) as Representative of Terrestrial Invertebrates

Justification

Earthworms were selected as representative of terrestrial invertebrates due to their feeding habits, ubiquitous distribution throughout many habitats and soil conditions, and importance in providing a food base for many small- to medium-sized predators. A diet of detritus, microflora, and microfauna, combined with direct contact with the surrounding soil, presents a potential link between soil contaminants and soil-invertebrate consumers. In addition, earthworms were observed in both the wooded and open field areas of the Avtex Fibers Site.

Life History

Earthworms feed on dead and decaying plant and animal remains and on free-living soil microflora and microfauna. Their primary source of food is dead plant material, especially plant litter. Next to food, their most important requirement is adequate moisture. Water conservation mechanisms are poorly developed; respiration depends on diffusion of gases through the body wall which must be kept moist. Earthworms are generally absent or rare in soils with very coarse texture, in soils with high clay content in regions of high rainfall, and in soils with a pH of less than 4 (Lee 1985).

Earthworms are hermaphroditic and most species reproduce by cross-fertilization, although many species can also produce cocoons parthenogenetically. Sexual reproduction cannot occur without a clitellum; ovaries, oviducts, and possibly the ovisacs, but male organs are not essential. The population of an earthworm species at any one time consists of young immature, well-grown immature (adolescent), mature, and senescent individuals (Edwards and Lofty 1977).

Earthworms have several ways of surviving adverse environmental conditions such as soil desiccation and ambient cold and heat. In terms of population survival, the cocoons can resist desiccation and temperature extremes much more easily than mature individuals. Worms may also migrate to deeper soil or undergo states of inactivity until environmental conditions become favorable once again (Edwards and Lofty 1977).

Some species of worms grow throughout their lives by continually adding segments proliferated from a growing zone located just in front of the anus. Other species, such as *E. foetida*, possess the adult number of segments upon hatching and increase in size without increasing the number of segments. The life span of *Eisenia foetida* was reported to be approximately 4.5 years under laboratory conditions (Edwards and Lofty 1977).

Exposure Profile

Direct contact with contaminated soil is the primary route of exposure for earthworms in this risk assessment. Survival and growth endpoints following exposure to site soils will be used to evaluate risk to these organisms. Tissue residue analysis will also be conducted on the worms to determine exposure to higher trophic level organisms.

2.11.2 Raccoon (*Procyon lotor*) as Representative of Omnivorous Mammals

Justification

The raccoon was selected as representative of a omnivorous mammal due to its dietary composition, relative abundant distribution, and its known occurrence at the Avtex Fibers Site. Its diet allows for the evaluation of contamination in site sediment. In addition, the concentration of contaminants found in forage fish tissue and clams will also provide an accurate dose to the raccoon which allows for the evaluation of contaminants in the food source.

Life History

Raccoons are medium-sized omnivores and are abundant throughout North America. Raccoons prefer aquatic habitats, particularly hardwood swamps, flood plains, freshwater wetlands, and salt marshes (Kaufmann 1982). Raccoons have also adapted well to residential areas and farmlands. Raccoons rely heavily on surface waters for foraging and as a source of drinking water (Stuewer 1943). Raccoons are active primarily from dusk to dawn (Stuewer 1943) but will alter their activities to opportunistically feed on whatever is available (Sanderson 1987). For example, raccoons living near a salt marsh may become active during the day to take advantage of feeding opportunities during low tide (Ivey 1948). Raccoons feed primarily on fruits, nuts, acorns, grains, insects, frogs, crayfish, and eggs (Palmer and Fowler 1975).

Raccoons in the southern regions of the United States are active year round (Goldman 1950). Adult raccoons are normally solitary but will come together for short periods of time during mating (Kaufman 1982). Mating occurs from March to June in southern areas and each male may mate with several females during each season (Sanderson 1987; Kaufman 1982). Young males are normally not sexually mature in the first breeding season but mature later in the summer, while females mature in the first year (Sanderson 1951).

The home range of a raccoon depends on the animal's age, habitat, food resources, and season (Sanderson 1987). Home ranges are typically a few hundred hectares (ha) but ranges as large as a few thousand ha have been reported (Sanderson 1987). Population densities also depend strongly on the amount of resources in the area. Numbers of 0.1 to 0.2 animals per ha are common (Hoffman and Gottschang 1977).

Raccoons are found near every aquatic habitat. During the last 50 years raccoon populations have increased greatly (Sanderson 1987). In Alabama, adult male raccoons weighed up to 8.8 kilograms (kg) (mean 4.31 kg) while adult females can weigh up to 5.9 kg (mean 3.67 kg) (Johnson 1970). Adult raccoons weigh between 2 and 12 kg (Nowak 1991), and consume 0.5 kg of food per day (Newell et al. 1987).

Raccoons feed primarily on fruits, nuts, acorns, grains, insects, frogs, crayfish, eggs (Palmer and Fowler 1975). In a Maryland forested bottom land, the dietary composition of raccoons during the summer was principly made up of insects (39 percent), wild cherry (17 percent), blackberries (16 percent), crayfish (8 percent), snails (5 percent), herptiles (5 percent), fish (2 percent), rodents (2 percent), corn (1 percent), and trace amounts of *Smilax*, acorns and pokeberry (Llewellyn and Uhler 1952). At Washington state tidewater area raccoons displayed the following dietary composition: molluscs, mussels and oyster (44 percent), Crustacea, shrimp and crabs (25 percent), fish (9 percent), marine worms (20 percent), and Echiurida worms (1 percent) (Tyson 1950).

The home range of a raccoon depends on the animal's age, habitat, food resources, and season (Sanderson 1987). Home ranges are typically a few hundred hectares but ranges as large as a few thousand hectares have been reported (Sanderson 1987). The home range for adult male raccoon found in coastal Georgia raccoons is approximately 65 ha (± 18 SE) while the home range for adult females in the same area is approximately 39 ha (± 16 SE) (Lotze 1979). Population densities also depend strongly on the amount of resources in the area. Numbers of 0.1 to 0.2 animals per hectare is common (Hoffman and Gottschang 1977).

Exposure Profile

For the purposes of this risk assessment, a body weight of 2 kg, an ingestion rate of 0.5 kg/day, and a diet of 80 percent forage fish and 20 percent clams were assumed. A soil ingestion rate of 9.4 percent of the diet has been reported for raccoons (Beyer et al. 1991). Multiplying the ingestion rate by 9.4 percent yields a sediment ingestion rate of 0.047 kg/day. A daily water ingestion rate of 0.18 Liters per day (L/day) was calculated using an allometric equation derived by Calder and Braun (1983).

2.11.3 Belted Kingfisher (*Megaceryle alcyon*) as Representative of Piscivorous Birds

Justification

The belted kingfisher was selected as representative of a piscivorous bird due to its dietary composition, relative abundant distribution, and likelihood of occurrence at the Avtex Fibers Site. Their piscivorous diet allows for the evaluation of contamination in both the basins and the river.

Life History

The belted kingfisher is a pigeon-sized, territorial bird that is the only kingfisher present throughout most of North America (Bull and Farrand 1977; NGS 1987). They inhabit rivers, lakes, and estuaries and are often seen patrolling a favorite sheltered section of a waterway for prey (NGS 1987). Food items include primarily shallow water fish, although crayfish, frogs, small snakes, salamanders, insects, crabs, and even mice may be consumed (Bull and Farrand 1977; Landrum et al. 1993). It is estimated that a pair of kingfishers with nearly fledged young requires approximately 90 fish per day to feed their offspring and themselves (Landrum et al. 1993).

This species is solitary with the exception of the nesting season. Breeding times for this species vary with locale. Unseasonably mild weather may initiate early nesting in the lower United States. The presence of herbaceous cover and good fishing habitat are the basis for the selection of breeding areas and nest sites. Nests consists of stream bank or shoreline burrows and vary in length depending upon the soil texture. Although usually near water, nests have been found up to 1.6 kilometers (km) away from water. A clutch of six to seven eggs are usually laid between early April and mid-June. Incubation lasts for 25 days with nest occupation for an additional 23 days. The fledglings remain near the nest and juveniles disperse by mid-summer (Landrum et al. 1993).

Males generally do not readily leave their territories and will remain there throughout the winter as long as ice does not impede fishing. Females typically migrate southward and return to the same mate and nesting site every year. The likelihood of migration for both males and females appears to depend on the severity of the winter (Landrum et al. 1993).

Exposure Profile

Adult belted kingfishers weigh from 0.113 to 0.215 kg (Fry and Fry 1992). The lowest reported body weight of 0.113 kg was assumed for this risk assessment. Although the home range of this species varies seasonally and is usually reported as kilometers of shoreline (Landrum et al. 1993), the home range was assumed to be approximately 160 acres (DeGraaf and Rudis 1993).

The food ingestion rates for adult kingfishers is estimated at 50 percent body weight per day (BW/day)(U.S. EPA 1993). Based on a food ingestion rate of 0.113, this calculates to an ingestion rate of 0.06 kg/day.

A water ingestion rate of 0.11 g/g BW/day is estimated for this species (U.S. EPA 1993). To express this value in units of g/day, the water ingestion rate was multiplied by the lowest reported body weight, 113 g, to yield a water ingestion rate of 12.43 g/day [12.43 milliliters per day (mL/day)].

Belted kingfishers are reported to consume fish ranging in size from 25 to 178 millimeters (mm) in length (Sayler and Langler 1946). In keeping with the conservative approach of this risk assessment, the amount of sediment entrained in fish 178 mm long was predicted. The standard weight of a 178 mm bluegill was calculated to be 122.6 g based on the following algorithm relating length to weight (Hillman 1982):

$$\log \text{Weight (g)} = -5.374 + 3.316 \log \text{Length (mm)}$$

An incidental sediment ingestion rate could not be identified for the belted kingfisher. To evaluate this exposure pathway, a model was developed that predicted the amount of sediment which may be entrained in the digestive system of a fish, the bluegill (*Lepomis machrochirus*). This was assumed to be the primary mechanism by which a piscivorous bird such as the belted kingfisher may incidentally ingest sediment.

A study evaluating the stomach contents of 153 bluegills reported an average content of

[redacted]

detritus and sediment to be 9.6 percent of the total diet (Kolehmainen 1974). A daily food ingestion rate of 1.75 percent of the body weight per day has been reported for the bluegill (Kolehmainen 1974). This provides a predicted intake rate of 2.15 g of food per day for a 122.6 g fish. If a conservative assumption is made that 9.6 percent of the food ingested is entirely sediment, it can be predicted that a fish of this size may contain 0.206 g of sediment in its digestive system.

For the purpose of this model, it was assumed that the level of sediment contained in the digestive system of a fish remains constant over time. This value (0.206 g) was divided by the predicted fish body weight (122.6 g) to express sediment entrained in fish digestive systems in units of grams of sediment per gram of fish body weight. This provided a value of 0.0017 g sediment/g body weight. When this value is multiplied by the food ingestion rate of the belted kingfisher (60 g/day), the predicted sediment ingestion rate for the kingfisher is 0.1 g/day.

2.11.4 American Woodcock (*Scolopax minor*) as Representative of Worm-Eating Birds

Justification

The American woodcock was selected as representative of a worm-eating bird due to its dietary composition, relative abundant distribution, and likelihood of occurrence at the Avtex Fibers Site. Its diet allows for the evaluation of contamination in site soils. In addition, the concentration of contaminants found in earthworm tissue will also provide an accurate dose to the woodcock which allows for the evaluation of contaminants in the food source.

Life History

Woodcock prepare a nest in a slight depression on the ground using dry leaves to form a lining. The eggs are a pale color with spots of reddish-brown or gray. The young are able to run soon after hatching and may be carried by the female to and from feeding areas. Woodcocks eat mostly worms, grubs, and insects (Thorburn 1989). The woodcock is similar in size to a bobwhite and the average length is 11 inches (from the tip of the bill to the tip of the tail).

The woodcock is widespread east of the plains, from Canada to the Gulf States. It inhabits wet thickets and brushy swamps (Peterson 1986).

Exposure Profile

An adult woodcock weighs 165 g and consumes 83 g of food per day. The diet of the American woodcock consists almost exclusively of earthworms and other terrestrial invertebrates (Ehrlich et al. 1988, Sheldon 1967, U.S. EPA 1993). Plant material (seeds, fruit) is also occasionally consumed by the woodcock (U.S. EPA 1993). An incidental soil ingestion rate of 9 percent of the diet is reported [7.5 g of soil per day (Beyer et al. 1994)]. Home range size of a woodcock is 45 acres (Wilson 1982).

For the purposes of this risk assessment, a body weight of 165 g, an ingestion rate of 83 g/day, and a diet of 100 percent earthworms were assumed. In addition, an incidental soil ingestion rate of 7.5 g/day was used.

2.11.5 Red-tailed Hawk (*Buteo jamaciensis*) as Representative of Carnivorous Birds.

Justification

The red-tailed hawk was selected as representative of a carnivorous bird due to its dietary composition, relative abundant distribution, and likelihood of occurrence at the Avtex Fibers Site. Its diet allows for the evaluation of contamination in site soils. In addition, the concentration of contaminants found in small mammal tissue will also provide an accurate dose to the red-tailed hawk which allows for the evaluation of contaminants in the food source.

Life History

Red-tailed hawks are the most common and widespread American *Buteo* (Bull and Farrand 1977). Their habitat is highly variable, but they are commonly found in wooded areas near open land. They also inhabit plains, prairie groves, and deserts in the western United States (NGS 1987). This species is absent, however, from tundra, and rare in extensive unbroken forest. An opportunistic feeder, the red-tailed hawk hunts from a perch or on the wing for food items such as small mammals (e.g., mice, chipmunks, rabbits), birds (usually ground-dwelling species), reptiles, insects, and occasionally, prey species that are too heavy to lift off the ground (Burton 1989).

The breeding season starts with aerial courtship displays, commonly followed by mating on a perch and nest-building by both sexes. Nests are placed in tall trees, high rock ledges, or tall cacti and are often refurbished annually for use in consecutive years. Incubation of two to three eggs is carried out by both sexes and lasts for approximately 30 days. The young are able to feed themselves at 4 to 5 weeks and fledge in about 45 days (Bull and Farrand 1977; Burton 1989).

Exposure Profile

Adult male and female red-tailed hawks are reported to weigh 960 g and 1,235 g, respectively (DeGraaf and Rudis 1983; U.S. EPA 1993). Home ranges vary from 148.26 to 395.36 acres (Kirkwood 1980). The lowest reported body weight of 0.960 kg was used for this risk assessment.

The diet of a red-tailed hawk consists of mammals, birds, reptiles, and insects which vary in importance with season and availability (U.S. EPA 1993). Food ingestion rates are reported to range from 136 to 400 g/day (Kirkwood 1980). The highest reported food ingestion rate of 400 g/day was assumed for this risk assessment. A water ingestion rate of approximately 0.059 g/g BW/day has been estimated for this species (U.S. EPA 1993). To express this value in units of g/day, the water ingestion rate was multiplied by the lowest reported body weight of 960 g to yield a water ingestion rate of 56.64 g/day (56.64 mL/day).

A soil ingestion rate for the red-tailed hawk could not be found in the literature; therefore, the amount of soil predicted to be entrained in the digestive tract of a white-footed mouse was used to calculate this value. A soil ingestion rate of less than 2 percent of the total diet has been reported (Beyer et al. 1994) for the white-footed mouse. From this value, a conservative soil ingestion rate of 1.9 percent of the total diet was assumed for the white-footed mouse. To express this value in units of g/day, the soil ingestion rate of 1.9 percent was multiplied by the food ingestion rate of the white-footed mouse

(4.50 g/day) (U.S. EPA 1993) to yield a soil ingestion rate of 0.09 g/day. This value was assumed to represent the amount of soil entrained in the digestive tract of the white-footed mouse that remains constant over time. To express 0.09 g in units of grams of soil per gram of mouse body weight, this value was divided by the lowest reported body weight (13 g) of the white-footed mouse (Merritt 1987) to yield a value of 0.007 g/g BW. This value was then multiplied by the food ingestion rate of the red-tailed hawk (400 g/day) to yield a soil ingestion rate of 2.8 g/day.

2.11.6 Red Fox (*Vulpes vulpes*) as Representative of Carnivorous Mammals

<u>Justification</u>

The red fox was selected as representative of a carnivorous mammal due to its dietary composition, relative abundant distribution, and likelihood of occurrence at the Avtex Fibers Site. Its diet allows for the evaluation of contamination in site soils. In addition, the concentration of contaminants found in small mammal tissue will also provide an accurate dose to the red fox which allows for the evaluation of contaminants in the food source.

<u>Life History</u>

Red fox inhabit open meadows, ditch banks, field and wood edges, fencerows, stream and lake borders, and farmlands (Hoffmeister 1989; Jones and Birney 1988; Merritt 1987). With the exception of the breeding season, red fox have no permanent home but sleep on the ground (Schwartz and Schwartz 1981). A den, usually modified from an existing woodchuck or fox den, is dug during the breeding season and exceptionally cold winters (Barbour and Davis 1974). These scent-marked dens have multiple rooms, entrances, and trails leading to and from hunting areas (Schwartz and Schwartz 1981). In addition to their dens, both males and females will defend their scent-marked hunting territory from intruders (Jones and Birney 1988).

The red fox is primarily an opportunistic carnivore, consuming food items such as rabbits, opossums, muskrats, skunks, rodents, birds, eggs, carrion, invertebrates, snakes, and frogs (Barbour and Davis 1974; Merritt 1987). Some vegetable matter such as fruits and nuts are also consumed when in season (Jones and Birney 1988). During times of abundant food supply, the red fox will bury surplus food to return to for consumption at a later time (Schwartz and Schwartz 1981).

Male and female foxes pair for life, remaining together from midwinter to summer. Females bear one litter per year usually between March and April (Merritt 1987). Gestation periods last from about 49 to 56 days, with most averaging 53 days (Schwartz and Schwartz 1981). The pups are weaned at about 60 days, leave the den in the autumn, and are sexually mature by their first winter (Merritt 1987). Natural predators of the red fox are few but include large hawks and owls, and possibly coyotes (Merritt 1987; Schwartz and Schwartz 1981). Red fox may live from six to ten years in the wild (Schwartz and Schwartz 1981).

<u>Exposure Profile</u>

Adult red fox weigh from 2.7 to 7 kg (Barbour and Davis 1974; Jones and Birney 1988). Home ranges vary from 245 to 1,235 acres (Merritt 1987).

The food ingestion rates of the red fox range from 0.069 g/g BW/day for a nonbreeding adult, to 0.16 g/g BW/day for a juvenile (U.S. EPA 1993). The water ingestion rate for an adult red fox is estimated to be approximately 0.086 g/g BW/day (U.S. EPA 1993). To express these values in units of g/day, the highest reported food ingestion rate of 0.16 g/g BW/day and the water ingestion rate of 0.086 g/g BW/day were multiplied by the lowest reported body weight of 2.7 kg (2,700 g) to yield a food ingestion rate of 432 g/day and a water ingestion rate of 232.2 g/day (232.2 mL/day).

A soil ingestion rate of 2.8 percent of the total diet has been reported (Beyer et al. 1994) for the red fox. To express this value in units of g/day, the soil ingestion rate of 2.8 percent was multiplied by the food ingestion rate of 432 g/day to yield a soil ingestion rate of 12.1 g/day.

2.11.7 Chironomid (*Chironomus tentans*) and Amphipod (*Hyallela azteca*) as Representatives of Benthic Invertebrates

Justification

Chironomus tentans and *Hyallela azteca* were selected as representative of benthic invertebrates due to their direct contact with sediment for a significant portion of their life cycle, ubiquitous distribution in aquatic systems, importance as a food item for aquatic-invertebrate consumers, and ease of use in laboratory toxicity evaluations. These species are also likely to occur in the surface sediment at the Avtex Fibers Site.

Life History (*Chironomus tentans*)

Chironomus tentans are widely distributed midges that are commonly found in eutrophic lakes, ponds, streams, and rivers throughout North America. The larvae of this insect are an important food source for fish, waterfowl, and larger aquatic invertebrates. They are generally found in upper sediment layers, and are rarely found at depths greater than 10 centimeters (cm) (U.S. EPA 1994).

This species is aquatic during the larval and pupal stages. The life cycle is divided into the following four distinct stages: (1) egg, (2) larvae consisting of 4 instars, (3) pupae, and (4) adult. After mating the female adult midge oviposits a single egg mass directly into the water. Each egg mass contains approximately 2,300 eggs that will hatch in 2 to 4 days depending on environmental conditions. The whole life cycle takes about 24 days (U.S. EPA 1994).

After hatching, the larvae begin to build tubes in which they will feed. The larvae generally draw small food particles into their tubes for feeding, but may also feed outside their tubes. The four larval stages are followed by an intermediate pupal stage and finally by an ephemeral adult stage. Adults mate immediately after emergence, during flight (U.S. EPA 1994).

Exposure Profile (*Chironomus tentans*)

Since direct contact with contaminated sediment in the toxicity evaluation is the primary route of exposure for *Chironomus tentans* in this risk assessment, the results of the test will be used to indicate exposure.

Life History (*Hyallela azteca*)

[redacted]

The amphipod, *Hyallela azteca*, is commonly found in freshwater lakes, streams, ponds, and rivers throughout North and South America. In preferred habitats, they are known to reach densities in excess of 10,000 per square meter. They may also be found in sloughs, marshes, and ditches, but generally in lower numbers (U.S. EPA 1994).

Hyallela azteca are epibenthic detritivores that feed on coarse particulate organic material. They typically burrow into surface sediment, and avoid bright light. Because of their feeding and behavioral characteristics, they are ideal test organisms for toxicological evaluation of freshwater sediments. Avoidance of light by movement into the sediment keeps these organisms almost constantly in contact with sediment contaminants (U.S. EPA 1994).

Reproduction in this crustacean is sexual. Males are larger than females and have larger front gnathopods that are presumably used for holding the female during amplexus and copulation. During amplexus, the male and female feed together for a period of up to one week. The pair separates temporarily while the female goes through a molting period. Immediately after the molt, the two rejoin and copulation begins. During copulation, the male releases sperm near the female's marsupium. The female sweeps the sperm into her marsupium, and simultaneously releases eggs from her oviducts, into the marsupium, where fertilization takes place. The average brood size for female *Hyallela azteca* is 18 eggs per brood, but this number can vary with environmental conditions and physiological stress (U.S. EPA 1994).

Developing embryos and hatched young are kept inside the female's marsupium until she undergoes a second molt. At that time, the juvenile *Hyallela azteca* are released into the surrounding environment. Under favorable conditions, each female produces approximately one brood during every ten day time period (U.S. EPA 1994).

Hyallela azteca have a minimum of 9 instars, with 5 to 8 pre-reproductive stages. The first five stages are juvenile stages; instars 6 and 7 form the adolescent stages; and stages 8 and higher are considered adult (fully reproductive) stages (U.S. EPA 1994).

Exposure Profile for *Hyallela azteca*

Since direct contact with contaminated sediment in the toxicity evaluation is the primary route of exposure for *Hyallela azteca* in this risk assessment, the results of the test will be used to indicate exposure.

2.11.8 Cladoceran (*Ceriodaphnia dubia*) as Representative of Aquatic Invertebrates

Justification

Ceriodaphnia dubia was selected as representative of aquatic invertebrates due to its direct contact with water throughout the life cycle, its ubiquitous distribution in aquatic systems, its importance as a food item for aquatic-invertebrate consumers, and its ease of use in laboratory toxicity evaluations.

Life History

Ceriodaphnia dubia are small crustaceans that have flattened leaf-like legs, a single, central compound eye, and 4 to 6 pairs of thoracic legs covered by a clear to yellow carapace. The carapace is used as a brood chamber. The large paired appendages used

[redacted]

for swimming are second antennae (Dodson and Fry 1991). Taxonomically, *Ceriodaphnia* resemble *Daphnia* except they are more round and lack prominent rostral projection typical of *Daphnia*. They exhibit some cyclomorphism, but do not develop dorsal helmets and long posterior spines typical in *Daphnia* (U.S. EPA 1986). Because of the jerky swimming pattern, they are commonly referred to as water fleas.

Cladocera are widespread occurring in most freshwater habitats, and they can be abundant enough to form swarms. They are most abundant in standing water and because most cladocerans reproduce asexually, most individuals will be females. Cladoceran eggs develop in the brood chamber and the neonates resemble adults but are smaller (Dodson and Fry 1991).

Ceriodaphnia are often used for toxicity testing because they reproduce 3 to 4 broods a week under optimal conditions and therefore provide reproductive information (e.g., reduced brood size) of the matrix being tested (U.S. EPA 1986).

Because *Ceriodaphnia* feed on algae and bacteria, they play an important functional role in the ecosystem. They also provide an important food source for other invertebrates and fishes (Dodson and Fry 1991). Cladocerans are major primary and secondary consumers in lake ecosystems.

Exposure Profile

Since direct contact with contaminated water in the toxicity evaluation is the primary route of exposure for *C. dubia* in this risk assessment, the results of the test will be used to indicate exposure.

2.11.9 Fathead Minnow (*Pimephales promelas*) as Representative of Omnivorous Fish

Justification

The fathead minnow was selected as representative of omnivorous fish due to its dietary composition, direct contact with water throughout the life cycle, ubiquitous distribution in aquatic systems, importance as a food item for fish-eating consumers, and ease of use in laboratory toxicity evaluations.

Life History

The fathead minnow, *P. promelas*, is widely distributed in North America and is found in a variety of habitats such as small streams, ponds, and small lakes. It is uncommon or absent in streams of moderate and high gradients. It is tolerant of high temperature, high turbidity, and low oxygen concentrations (U.S. EPA 1985).

The fathead minnow is primarily omnivorous. Young typically feed on detritus, algae, and zooplankton. Adults feed on aquatic insects, worms, small crustaceans, and other animals. This species is considered an important food source for other fish and birds (U.S. EPA 1985).

Adult fathead minnows spawn in the spring and continue to spawn throughout most of the summer. The minimum spawning temperature appears to be approximately 16°C. The ovaries of the females contain eggs in all stages of development, and they spawn repeatedly as the eggs mature. The average number of eggs per spawn per female is 100

[redacted]

to 150. Larger females may lay 400 to 500 eggs per spawn. Hatching times depend on temperature and average about six days. In warm water with an ample food supply, spawning may occur as early as the first year. In cooler water with a moderate food supply, spawning usually occurs during the second year. Survival to the third year is relatively uncommon (U.S. EPA 1985).

Exposure Profile

Since direct contact with contaminated water in the toxicity evaluation is the primary route of exposure for fathead minnows in this risk assessment, the results of the test will be used to indicate exposure.

2.11.10 Redbreast Sunfish (*Lepomis auritus*) as Representative of Omnivorous Fish

Justification

Previous sampling conducted in this portion of the South Fork of the Shenandoah River indicate that redbreast sunfish are very common. In addition, because of the size and life history of this species, it makes them an excellent food source for other fish (e.g., smallmouth bass) and other animals. Therefore, redbreast sunfish were collected from five locations within the river and analyzed for metals and PCBs. The tissue concentration in these species will be used in the food ingestion models for smallmouth bass, belted kingfisher, and mink.

Life History

The redbreast sunfish (also referred to as the yellowbelly sunfish and bream) is a large sunfish, widely distributed in the Atlantic Coast drainages from New Brunswick to Florida. It has been introduced into Texas and Oklahoma. Although widespread, it does not become as locally abundant as other sunfish species (Cooper 1983).

The habitat of the redbreast sunfish are streams and the shallow waters of lakes and ponds. It is tolerant of turbid and brackish water; sunfish populations reproduce successfully in the tidal water of the Chickahominy River in Virginia. Normally solitary during warm weather, this species aggregates into tight inactive schools when the water temperature drops below 40 degrees Fahrenheit (Cooper 1983).

The redbreast sunfish feeds on insects, small molluscs, small fish, and worms (Cooper 1983; Miller and Robison 1973). They spawn in spring and early summer. The male constructs and guards a solitary nest. In areas where suitable substrate is scarce, nests may be packed together tightly as in the bluegill (Cooper 1983).

Exposure Profile

An adult redbreast sunfish typically ranges in length from 4 to 8 inches, although individuals as large as 11 inches have been reported (NAS 1983; Sternberg 1987). The average body weights that correspond to the typical size range of 4 to 8 inches are as follows: 4 inches = 0.05 pounds, 5 inches = 0.10 pounds, 6 inches = 0.17 pounds, 7 inches = 0.27 pounds, and 8 inches = 0.40 pounds (Sternberg 1987). The lowest reported adult body weight of 0.05 pounds (22.7 g) will be used for this risk assessment. A home range was not available for this species.

A dietary ingestion rate for the redbreast sunfish was not found in the literature, therefore, the highest reported dietary ingestion rate that was available for another fish species, the rainbow trout will be used. The highest reported dietary ingestion rate for the rainbow trout (6.52 percent of the body weight per day [NRC 1993]) was multiplied by the lowest reported body weight of an adult redbreast sunfish (22.7 g) to yield a food ingestion rate of 1.48 g/day.

A sediment ingestion rate for the redbreast sunfish was not found in the literature, therefore, the sediment ingestion rate of a similar fish species, the bluegill (*Lepomis machrochirus*) was used: A study evaluating the stomach contents of 153 bluegills reported an average content of detritus and sediment to be 9.6 percent of the total diet (Kolehmainen 1974). For this risk assessment, a conservative assumption will be made that the 9.6 percent is comprised entirely of sediment. Multiplying the sediment ingestion rate of 9.6 percent by the redbreast sunfish food ingestion rate of 1.48 g/day, yields a sediment ingestion rate of 0.14 g/day.

2.11.11 Carp (*Cyprinus carpio*) as Representative Omnivorous Fish

Justification

Previous anecdotal information indicated that carp were found in Sulfate Basin No. 5 and in the Shenandoah River. Because of the life history of this species (they are in direct contact with the sediment), it makes them an excellent species to evaluate the impacts of contaminants. Therefore, carp were collected from Sulfate Basin No. 5. In addition, an attempt was made to collect carp from the river. However, no carp were captured in the river. In addition, an attempt was made to collect carp from Fly Ash Basin No. 6. However, no carp were collected from this basin. The tissue concentration in carp will be used in the food ingestion model for belted kingfisher.

Life History

The common carp is a heavy-bodied minnow distinguished from similar species in the family Cyprinidae by the presence of barbels and serrated fin spines (Pflieger 1975; Smith 1985). The carp may be fully scaled, partially scaled, or nearly naked, for which local names such as mirror carp or leather carp are applied. In some areas, the common carp hybridizes with the goldfish (Sigler and Sigler 1987). The carp is a native of Asia that was introduced into Europe and North America (Pflieger 1975). This species is adapted to a wide range of habitats but is most often found where there is dense aquatic vegetation. However, in their feeding activities, they often destroy this vegetation by physically uprooting the plants and, by stirring up the bottom, they often make the water so turbid that light cannot reach the growing plants (Smith 1979; Smith 1985).

Carp are opportunistic omnivores, feeding most actively in the late evening or early morning (Pflieger 1975; Sigler and Sigler 1987). Their food is probably located more by taste than by sight. They feed mostly from the bottom, but have been observed sucking in objects floating on the surface (Pflieger 1975).

The common carp spawns in the spring in shallow water and weedy areas. Spawning may extend throughout the summer but may be interrupted during periods of cooler water temperatures (Smith 1985). This species does not build a nest nor does it care for its young. Five hundred to several thousand slightly adhesive eggs are broadcast in the water and stick on submerged debris and vegetation, or settle to the substrate (Sigler and

Sigler 1987). The eggs hatch in approximately 12 days (Smith 1979). Sexual maturity is attained from 2 to 4 years of age (Smith 1985).

Carp are extremely wary, long-lived, and fast-growing. The agility and rapid growth of young carp, and their tendency to hide in aquatic vegetation reduce the amount of predation on them. The strong spines on young and adult carp also render them unsuitable for many predators. Nevertheless, carp are preyed upon by various species of fish, birds, and mammals. White pelicans in the Great Basin feed extensively on young or yearling carp (Sigler and Sigler 1987).

Exposure Profile

Adult common carp are highly varied in size but typically range from 12 to 25 inches long and 1 to 8 pounds (Pflieger 1975). Carp are not highly migratory but occasionally individuals will move for long distances (Pflieger 1975).

A food ingestion rate for the carp was not available in the literature, therefore, an available food ingestion rate for a fish species with a similar feeding strategy (i.e., bottom feeder) was used. The channel catfish was reported to ingest 1.1 to 3.0 percent of its body weight per day (NRC 1993). Multiplying the highest reported food ingestion rate for the channel catfish (3.0 percent of the body weight per day) by the lowest reported body weight of an adult carp (1 pounds or 2.2 kg), yields a food ingestion rate of 0.07 kg/day for the carp.

Detritus and sand were reported to comprise 4 to 6 percent of the common carp's stomach contents (Walberg et al. 1971). A conservative assumption was made that the 4 to 6 percent of detritus and sand was comprised entirely of sand (or sediment). Multiplying the highest reported sediment ingestion rate (6 percent of the diet) by the food ingestion rate (0.07 kg/day) yields a sediment ingestion rate of 0.004 kg/day for the carp.

Since direct contact with contaminated water and sediment in the river and basins is the primary route of exposure for carp, the results of the tissue analysis will be used to indicate exposure.

2.11.12 Fingernail clams (Sphaeridae) as Representative Benthic Invertebrates

Justification

The QAWP specified the collection of an invertebrate species to fill a data gap of the concentration of contaminants in forage species. The species selected for collection was the crayfish. However, once a site reconnaissance was conducted, it was determined that crayfish were not abundant at this site, were difficult to capture, and were not available at every location. Upon close inspection, it was determined that fingernail clam were abundant at every sample location and easy to collect. Therefore, this species was substituted for collection. In addition, this species lives in close association with the sediment and therefore are likely to uptake contaminants which are bioavailable. The results of the tissue analysis of contaminants in this species will be used in the ingestion-based food models.

Life History

Clams are major deposit and filter feeders often representing the largest invertebrate mass within a body of fresh water (Thorp and Covich 1991). The fingernail clams are members of one of the truly cosmopolitan families (Sphaeriidae; superfamily Sphaericea; order Heterodonta) of freshwater mollusks. They are commonly found in almost any body of freshwater in North America. The nomenclature "fingernail clam" has been used indiscriminantly for species represented by the genera *Sphaerium* and *Pisidium* (Burch 1972).

The vast majority of clams are primarily suspension filter feeders, filtering unicellular algae, bacteria, fungi, and suspended detrital particles. Many species supplement filter feeding by consuming organic detritus or interstitial bacteria from the sediment, and by pedal feeding. Pedal feeding may help to explain the extensive horizontal locomotion displayed by many species. In some cases, sediment detritus may represent the major food source for these clams. Sediment detrital sources accounted for 65 to 75 percent of the total organic carbon in a stream *S. striatinum* population; filter feeding accounted for only 25 to 35 percent. Feeding rates of this population was estimated to be 3.67 grams of organic carbon per square meter per year (g $C/m^2/yr$) as seston (Thorp and Covich 1991).

The life span of Sphaeriidae may range from less than 1 year to greater than 5 years, with most species usually maturing in less than 1 year. Individuals are hermaphroditic and ovoviviparous (eggs hatch within the body of the individual and the young are released as free-living offspring). Sphaeriidae have an average fecundity of 3 to 7 young/adult/breeding season (*Pisidium*) and 3 to 24 young/adult/breeding season (*Sphaerium*). The extremely large size of their offspring greatly reduces the fecundity of these clams. The number of reproductive efforts per year range from 1 to 3. Relative juvenile survivorship is reported to be high, and relative adult survivorship is reported to be intermediate (Thorp and Covich 1991).

Predation by fish, shorebirds, ducks, macroinvertebrates, and insects is the most important regulator of clam populations. Populations are also subject to heavy infestation by a number of parasites, some of which may cause sterility and death. Disease in clam populations has been little studied (Thorp and Covich 1991).

Exposure Profile

Direct contact with contaminated water and sediment in the river is the primary route of exposure for fingernail clams. The results of the tissue analysis will be compared to toxicity values found in the literature to determine the risk to clams.

2.11.13 Mink (*Mustela vison*) as Representative of Carnivorous Mammals

Justification

The mink was selected as representative of a carnivorous mammal due to its dietary composition, relative abundant distribution, and likelihood of occurrence at the Avtex Fibers Site. Its diet allows for the evaluation of contamination in site soils. In addition, the concentration of contaminants found in clams and fish tissue will also provide an accurate dose to the mink which allows for the evaluation of contaminants in the food source.

[redacted]

Life History

Mink are distributed over much of boreal North America, southward throughout the eastern United States and in the west to California, New Mexico, and Texas (Jones and Birney 1988). They can be found in virtually any habitat containing permanent water thus, they are not commonly found in upland areas (Jones and Birney 1988). Although primarily nocturnal, their activity often extends into midday (Hoffmeister 1989).

Dens are always near water, and they are usually an old muskrat burrow or constructed by the mink itself (Jones and Birney 1988). Males tend to live in their own burrows which are less elaborate than ones occupied by females (Barbour and Davis 1974). Home ranges tend to be linear since mink often follow a shoreline (Jones and Birney 1988). Mink are solitary and mark their territories by spraying (Merritt 1987).

Seasonal food availability governs the dietary composition (Barbour and Davis 1974). Their diets may consist of crayfish, frogs, fish, snakes, rodents, rabbits, and plants among other items (Jones and Birney 1988; Schwartz and Schwartz 1981). Crayfish are a major portion of the summer diet in many regions of North America (Barbour and Davis 1981; Jones and Birney 1988; Merritt 1987).

Breeding occurs from January to early April with highly variable gestation periods ranging from 40 to 75 days (Merritt 1987; Schwartz and Schwartz 1981). A highly variable single litter of 1 to 17 young may be produced (Schwartz and Schwartz 1981). Average litter sizes vary among regions (Barbour and Davis 1974; Hoffmeister 1989; Jones and Birney 1988; Merritt 1987; Schwartz and Schwartz 1981). Young are weaned at about five to six weeks of age and are sexually mature by ten months (Merritt 1987; Schwartz and Schwartz 1981). Occasionally great horned owls, foxes, coyotes, bobcats, and dogs will prey on mink (Merritt 1987; Schwartz and Schwartz 1981). Although some individuals have lived up to six years, mink seldom exceed two years of age in the wild (Schwartz and Schwartz 1981).

Effects Profile

Adult mink weigh from 520 to 1,730 g (Merritt 1987; U.S. EPA 1993). Home ranges vary from 19 to 1,900 acres (U.S. EPA 1993).

A year-round food ingestion rate of 0.22 g/g BW/day has been estimated for both male and female mink (U.S. EPA 1993). To express this value in units of g/day, the food ingestion rate was multiplied by the lowest reported body weight (520 g) to yield a food ingestion rate of 114 g/day. An estimated water ingestion rate of 0.11 g/g BW/day was reported for farm-raised females (U.S. EPA 1993). To express this value in units of g/day, this water ingestion rate was multiplied by the lowest reported body weight of 520 g to yield a water ingestion rate of 57.2 g/day (57.2 mL/day).

An incidental sediment ingestion rate was not available from the literature; therefore, a predicted incidental ingestion rate for sediment that may be entrained in the digestive system of the prey item (fish) was used for this risk assessment. Consumption of this prey item was assumed to be the primary mechanism by which mink may incidentally ingest sediment. The derivation of the predicted level of incidental sediment ingestion via consumption of fish is described next.

Life history information for the bluegill (*Lepomis machrochirus*) was used to predict the amount of sediment that may be ingested by mink via consumption of fish. Adult bluegills range in size from 100 to 230 mm (Pflieger 1975; Smith 1985). In keeping with the conservative approach of this risk assessment, the amount of sediment entrained in the lowest body size of 100 mm in length was predicted. The weight of a 100 mm bluegill was calculated to be 18.11 g based on the following algorithm relating length to weight (Hillman 1982):

$$\log \text{Weight (g)} = -5.374 + 3.316 \log \text{Length (mm)}$$

A daily food ingestion rate of 1.75 percent BW/day has been reported for the bluegill (Kolehmainen 1974). This provides a predicted intake rate of 0.32 g of food per day for a 18.11 g fish. A study evaluating the stomach contents of 153 bluegills reported an average content of detritus and sediment to be 9.6 percent of the total diet (Kolehmainen 1974). If a conservative assumption is made that 9.6 percent of the food ingested is entirely sediment, it can be predicted that a fish of this size may contain 0.03 g of sediment in its digestive system.

For the purpose of this model, it was assumed that the level of sediment contained in the digestive system of a fish remains constant over time. This value (0.03 g) was divided by the predicted fish body weight (18.11 g) to express sediment entrained in fish digestive systems in units of grams of sediment per gram of fish body weight. This provided a value of 0.0017 g sediment/g body weight. When this value is multiplied by the food ingestion rate of the mink (114 g/day), the predicted sediment ingestion rate for the mink through consumption of fish is 0.2 g/day.

2.11.14 Smallmouth Bass (*Micropterus dolomieu*) as Representative of Piscivorous Fish

Justification

Previous sampling conducted in the South Fork of the Shenandoah indicated a large population of smallmouth bass. In addition, this species feeds on other fish. The tissue concentrations found in the redbreast sunfish will be used in an ingestion based model to determine the impact to this species.

Life History

The smallmouth bass is a large, slender, elongate bass with a moderately large mouth (Robison and Buchanan 1984). This species is often the ecological replacement for the spotted bass and the largemouth bass in clear, cool, permanent streams, pools, and lakes (Moyle 1976; Pflieger 1975). It exhibits little tolerance for siltation and turbidity and is generally found over silt-free rock or gravel bottoms outside of the main current (Pflieger 1975).

Smallmouth bass fry feed largely on crustaceans and aquatic insect larvae until they are about 1 inch long, whereupon they prey heavily on small fish (Moyle 1976; Pflieger 1975). Fish continue to be an important part of their diet, supplemented with crustaceans, amphibians, and insects (Moyle 1976). Smallmouth bass of all sizes are frequently cannibalistic (Moyle 1976).

Sexual maturity is usually attained during their third or fourth year. Nesting activity begins in the spring with the movement into the shallow water of lakes or quiet areas of a stream (Moyle 1976). The males excavate circular nests in the substrate, and the female deposits from 2,000 to 10,000 eggs into the nest (Robison and Buchanan 1984). Females may spawn in more than one nest and males may spawn with more than one female (Moyle 1976). The male guards the nest until hatching (2 to 10 days) (Moyle 1976). After hatching, the fry drop down into the gravel where they remain for about 6 days. By the ninth or tenth day after spawning, the fry, which have taken on a black coloration, work their way out of the substrate. This species may live for 10 to 12 years (Pflieger 1975).

Exposure Profile

Adult smallmouth bass typically weigh between 1 to 4.2 pounds and reach a length of 10 to 20 inches (Pflieger 1975; Robison and Buchanan 1984). This species usually restricts its activities to a single stream pool, but occasionally its home range includes several pools as much as 0.5 miles apart (Pflieger 1975).

A dietary ingestion rate for the smallmouth bass was not found in the literature; therefore, the highest reported dietary ingestion rate for the rainbow trout (6.52 percent of the body weight per day) will be used (NRC 1993). Multiplying this food ingestion rate by the lowest reported body weight of an adult smallmouth bass (1 pound or 2.2 kg) yields a food ingestion rate of 0.143 kg/day.

A sediment ingestion rate for this species was not found in the literature; therefore, the sediment ingestion rate of a bluegill (*Lepomis machrochirus*) was used (bluegill and smallmouth. These species are similar in that they both feed on small fish, crustaceans, and insects, and therefore, the relative percentage of sediment ingestion would also be similar. A study evaluating the stomach contents of 153 bluegills reported an average content of detritus and sediment to be 9.6 percent of the total diet (Kolehmainen 1974). For this risk assessment, a conservative assumption will be made that the 9.6 percent of the food ingested is entirely sediment. Multiplying the sediment ingestion rate of 9.6 percent by the smallmouth bass food ingestion rate of 0.143 g/day, yields a sediment ingestion rate of 0.014 kg/day.

3.0 ASSUMPTIONS

This risk assessment evaluates exposure to contaminants through food and incidental sediment/soil ingestion, direct exposure via toxicity testing, and comparison of media concentrations with published effect levels. The following conservative assumptions were made to conduct this risk assessment:

- An arithmetic mean and a maximum concentration of the contaminant levels measured in each of the separate matrices sediment, soil, or water) collected on site were used in risk calculations.

- This risk assessment focused on the following three scenarios: Exposure to contaminants in the sediment, water, and biota from the South Fork of the Shenandoah River; exposure to the sediment, water, and biota from on-site basins; and exposure to soil and biota collected from on-site areas.

- An area use factor (AUF) of 1 was assumed for all species using the site for feeding.

- Contaminants were assumed to be 100 percent bioavailable in the food ingestion models.

- Dietary composition information was obtained from the literature for the receptor species.

However, simplifications of complex diets were performed for the receptors.

- A literature search was conducted to determine the chronic toxicity of the contaminants of concern when ingested by the indicator species. If no toxicity values could be located for the receptor species, values reported for a closely related species (e.g., the same genus or those with a similar feeding strategy) were used. All studies were critically reviewed to determine whether study design and methods were appropriate. When values for chronic toxicity were not available, LD_{50} (median lethal dose) values were used. For purposes of this risk assessment, a factor of 100 was used to convert the reported LD_{50} to a No Observed Apparent Effect Level (NOAEL). A factor of 10 was used to convert a reported Lowest Observed Adverse Effect Level (LOAEL) to a NOAEL, and a factor of 10 was used to convert a reported LD_{50} to a LOAEL. If several toxicity values were reported for a receptor species, the most conservative value was used in the risk calculations regardless of toxic mechanism. Toxicity values obtained from long-term feeding studies were used in preference to those obtained from single dose oral studies. No other safety factors were incorporated into this risk assessment.

- In some cases, contaminant doses were reported as part per million contaminant in diet. These were converted to daily intake (in milligrams per kilogram body weight per day; mg/kg-day) by using the formula:

  Intake (mg/kg/day)=Contaminant Dose (mg/kg diet) x Ingestion Rate (kg/day) x 1/Bodyweight (kg)

  This conversion allows dietary toxicity levels cited for one species to be converted to a daily dose for a different species based on body weight. This daily dose may then be used to evaluate the risk to other species if no specific toxicity data are available for a target receptor.

4.0 EFFECTS PROFILE

Many contaminants detected at the Avtex Fibers Site do not have benchmarks. This excluded them from further consideration in this risk assessment, but does not exclude them as potential contaminants of concern. Based on the results of the preliminary risk assessment, the following compounds were considered COCs and their toxic effects are presented next: PAHs, CS_2, PCBs, As, Cd, Cr, Cu, Pb, Hg, Ni, and Zn. Based on the chemistry results, these compounds will be further evaluated using food chain accumulation models (except for PAHs and CS_2), the results of toxicity testing of specific matrices, and by comparison to toxicity studies presented in the literature. Contaminants exceeding their respective effect levels are assumed to be affecting receptor species and negatively impacting species, populations, and communities in the aquatic and terrestrial ecosystems at the Avtex Fibers site. Below is a summary of the literature in which NOAELs and LOAELs were identified for the 8 metals and PCBs.

4.1 Arsenic

The literature was reviewed to locate a NOAEL based on the dietary ingestion of As to a fish species. A NOAEL based on the dietary ingestion of As was not located. Therefore, a hazard quotient based on a food chain accumulation model for smallmouth bass was not calculated.

Several studies were located which determined the effects of As to mammals. A study conducted on cats indicated that a chronic oral toxicity dose was 1.5 mg/kg BW/day (Pershagen and Vahter 1979). The National Resources Council of Canada (1978) states that mammals in general have oral LD_{50}s that range from 10 to 50 mg/kg of lead arsenate. A study conducted on mice indicated an oral dose LD_{50} of 39.4 mg/kg BW/day and an oral dose LD_0 of 10.4 mg/kg BW/day after 96 hours (NAS 1977). For the purposes of this risk assessment, the chronic value for the cat was

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used to calculate HQs for mammals (1.5 mg/kg BW/day). This value was converted to a NOAEL of 0.15 mg/kg BW/day by dividing by a factor of 10. These values were used in the food chain exposure models for mink, red fox, and raccoon.

Eisler (1988a) reviewed several studies in which the toxicity of inorganic arsenicals to birds were measured. These studies indicate that sensitive species include the California quail (single oral dose LD_{50} of 47.6 mg/kg BW/day) (Hudson et al. 1984) and chicken (single oral dose LD_{50} of 33 mg/kg BW/day) (NAS 1977). For the purposes of this risk assessment, a LOAEL was calculated by dividing an acute dose of 33 mg/kg BW/day by 10 to achieve a value of 3.3 mg/kg BW/day. This LOAEL was then converted to a NOAEL of 0.33 mg/kg BW/day by dividing by a factor of 10. These values were used in food chain exposure models for American woodcock, belted kingfisher, and red-tailed hawk.

4.2 Cadmium

Although several studies were found that determined the effects of Cd exposure to fish, none of these studies were based on an ingested value. Therefore, a hazard quotient based on a food chain accumulation model for smallmouth bass was not calculated.

One study was located which determined the effects of cadmium to mammals. This study indicated a NOAEL of 0.75 mg/kg/day (Loser and Lorke 1977). This value was converted to a LOAEL of 7.5 mg/kg BW/day by multiplying by a factor of 10. These values were used in food chain exposure models for red fox, raccoon, and mink.

Several studies were located which described the toxicity of cadmium to avian receptors. A study conducted on mallard ducks indicated a decrease in packed cell volume and hemoglobin, and mild to severe kidney lesions based on 20 mg/kg Cd. This converts to a daily dose of 3.31 mg/kg/day (Cain et al. 1983). White et al. (1984) found that a dose of 4 mg/kg/day causes testicular damage in mallards and Leach et al. (1979) found that 8.4 mg/kg/day caused a significant decrease in egg production in chickens. For the purposes of this risk assessment, a LOAEL of 3.31 mg/kg/day was used to evaluate risk to avian species. This value was converted to a NOAEL of 0.33 mg/kg BW/day by dividing by a factor of 10. These values were used in food chain exposure models for American woodcock, belted kingfisher, and red-tailed hawk.

4.3 Chromium

Only one study measuring the toxicological effects of dietary Cr to a piscivorous fish was found. The test species used in this study, *Oncorhynchus mykiss* (rainbow trout) will be used as a surrogate for piscivorous fish in the evaluation of dietary Cr exposure in this risk assessment.

Juvenile rainbow trout (mean weight = 5.5 g) were fed to satiation five times daily with a diet containing Cr^{+3} as $CrCl_3{\cdot}6H_2O$ at concentrations of 1, 3, or 6 mg/kg for a period of eight weeks in a flow-through system (Tacon and Beveridge 1982). Background Cr concentration in the flow-through aerated water was 1.87 µg/L. Fish fed the diet containing 6 mg/kg of Cr^{+3} (0.12 mg/kg BW/day) exhibited a significant ($p<0.05$) 27% reduction in body weight gain from the 1 mg Cr/kg treatment. The reduced growth rate resulting from a dietary Cr level of 0.12 mg/kg/day was considered an adverse effect in this risk assessment due to the lack of additional literature. A dietary level of 6 mg/kg (0.12 mg/kg BW/day) of Cr in prey items was used as a LOAEL for the smallmouth bass. This value was converted to a NOAEL of 0.012 mg/kg BW/day by dividing by a factor of 10.

Several studies measuring the toxicological effects of dietary chromium to mammals were found.

Steven et al (1976) found the LD_{50} for mice of 260 mg/kg BW for trivalent chromium and 5 mg/kgBW for hexavalent chromium. Rabbits fed both tri- and hexavalent chromium at a rate of 1.7 mg/kg BW/day had altered blood chemistry and severe morphological changes in the liver (Tandon et al. 1978). A dietary level of 1.7 mg/kg BW/day chromium will be used as a LOAEL and a dietary level of 0.17 mg/kg BW/day will be used as a NOAEL for red fox, raccoon, and mink.

Heinz and Haseltine (1981) exposed 2- to 3-year old breeding pairs of black ducks (*Anas rubripes*) to a diet containing 0, 20, or 200 mg/kg, wet weight, (0, 2.77, or 27.77 mg/kg BW/day) of Cr^{+3} as chromium potassium sulfate $[CrK(SO_4)_2 \cdot 12H_20]$ for a period of approximately five months, until the onset of egg-laying by the females. Hatched ducklings were then fed a mash diet containing the same Cr concentrations that the parents were fed. Seven-day old chicks were tested for avoidance behavior in response to a fright stimulus. None of the Cr concentrations resulted in alteration of avoidance behavior. A dietary level of 200 mg/kg (27.8 mg/kg BW/day) of Cr in prey was used as a NOAEL for the avian species. This values was converted to a LOAEL of 277.8 mg/kg BW/day by multiplying by a factor of 10. These values were used in the food chain exposure models for American woodcock, belted kingfisher, and red-tailed hawk.

4.4 Copper

Although several studies were available which determined the effects of Cu exposure in the water, none were available which determined the effects due to the ingestion of Cu. Therefore, a hazard quotient based on a food chain accumulation model for smallmouth bass was not calculated.

One study was located which determined the effects of ingestion of Cu to mammals. An oral dose of 100 mg/kg/day to a dog caused death (OHMD 1987). For the purposes of this risk assessment, this concentration was converted to a LOAEL of 10 mg/kg/day by dividing by a factor of 10. This values was converted to a NOAEL of 1 mg/kg/day by dividing by a factor of 10. These values were used in the food chain exposure models for red fox, raccon, and mink.

Several studies were located which determined the effects of Cu on chickens. A dose of 350 mg/kg (61.3 mg/kg/day) caused a significant decrease in growth and food consumption (Smith 1969). Another study found that a dose of 325 mg/kg (23.5 mg/kg/day) caused respiratory problems (Hatch 1978). Assuming that respiratory problems are an acute effect, a concentration of 23. 5 mg/kg BW/day was converted to a LOAEL of 2.35 mg/kg/day by dividing by a factor of 10. This value was further converted to a NOAEL of 0.235 mg/kg/day by dividing by a factor of 10. These values were used in the food chain exposure models for American woodcock, belted kingfisher, and red-tailed hawk.

4.5 Lead

The literature was reviewed to locate a NOAEL based on the dietary ingestion of Pb to a fish species. A NOAEL based on the dietary ingestion of Pb was not located. Therefore, a hazard quotient based on a food chain accumulation model for smallmouth bass was not calculated.

Several studies were located which determined the effects of Pb ingestion to mammals. A study conducted on mice indicated that 1.5 mg/kg/day of Pb caused a reduction in success of implanted ova (Clark 1979). Another study found that 2.2 mg/kg/day caused a reduction in the frequency of pregnancy when the dose was administered 3 to 5 days following mating (Clark 1979). A diestary dose of 1.5 mg/kg BW/day was used as a LOAEL. This value was converted to a NOAEL of 0.15 mg/kg BW/day by dividing by a factor of 10. These values were used in the food chain exposure models for red fox, raccoon, and mink.

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The gastric motility of adult male and female red-tailed hawks fed 0.82 and 1.64 mg Pb/kg BW/day in a single oral dose was evaluated through the use of surgically implanted transducers for a period of three weeks following the dose. Neither concentration had any effect on gastric contractions or egestion of undigested material pellets (Lawler et al. 1991). Another study conducted on red-tailed hawk found that 3 mg/kg/day of Pb caused the clinical symptoms of Pb poisoning (Reiser and Temple 1981). A similar study found that 3 mg/kg/day fed to starlings caused a reduction in muscle condition and altered their feeding activity (Osborne et al. 1983). A dietary dose of 3 mg/kg/day was used as a LOAEL. This value was converted to a NOAEL of 0.3 mg/kg BW/day by dividing by a factor of 10. These values were used in food chain exposure models for American woodcock, belted kingfisher, and red-tailed hawk.

4.6 Mercury

No studies measuring the effects of dietary Hg to the smallmouth bass were found; therefore, studies utilizing the rainbow trout were reviewed. The rainbow trout was used as a surrogate for piscivorous fish in this risk assessment.

Fingerling rainbow trout (1.7 g) fed 1.60 mg Hg/33.3 g food (0.94 mg Hg/kg BW/day) as methyl mercuric chloride (CH_3HgCl) for approximately 40 weeks exhibited a 40 percent reduction in growth, loss of appetite, inability to locate food, darkened color, and an increase in the frequency of swimming collision with the wall of the test vessel (Matida et al. 1988). A dietary level of 0.94 mg/kg BW/day was used as LOAEL. This value was converted to a NOAEL of 0.094 mg/kg BW/day by dividing by a factor of 10. These values were used in food chain exposure models for the smallmouth bass.

Several studies were found that evaluated the effects of Hg on mammals. A study conducted on rats indicated that 0.5 mg/kg/day caused reduced fertility (Khera 1979). A study conducted on dogs indicated that 0.1 mg/kg/day caused a high incidence of still births (Khera 1979). A dietary level of 0.1 mg/kg BW/day was used as a LOAEL. This value was converted to a NOAEL of 0.01 mg/kg BW/day by dividing by a factor of 10. These values were used in food chain exposure models for red fox and raccoon.

Several studies were conducted which determined the effects of Hg to mink. A dose of 1.5 mg/kg/day caused no adverse effects on survival or reproduction in mink (Aulerlich et al. 1974). In a study conducted by Wobeser et al. (1976), anorexia, weight loss, ataxia, and convulsions were noted at a dose of 0.27 mg/kg BW/day. A dietary dose of 0.27 mg/kg BW/day was used as a LOAEL. This value was converted to a NOAEL of 0.027 mg/kg BW/day by dividing by a factor of 10. These values were used in food chain exposure models for mink.

Effects of dietary methylmercury on zebra finches (seed eaters) were evaluated by Scheuhammer (1988). Four groups of birds were fed diets containing 0, 1.0, 2.5 or 5.0 mg/kg methylmercury. A dietary level of 5 mg/kg caused significant neurological impairment and death in zebra finches. No symptoms were noted in the group fed levels of 2.5 mg/kg.

Kidney lesions were found in juvenile starlings (*Sturnus vulgaris*; omnivores) that consumed a commercial diet contaminated with 1.1 mg/kg Hg (0.12 mg/kg BW/day) (Nicholson and Osborn 1984). A dietary dose of 0.12 mg/kg BW/day was used as a LOAEL. This value was converted to a NOAEL of 0.012 mg/kg BW/day by dividing by a factor of 10. These values were used in food chain exposure models for American wodcock.

Goshawks were fed a diet of chickens which had been fed methylmercury-dressed wheat (0.4 to

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0.5 mg/kg BW/day) for 5 to 6 weeks and sacrificed (Borg et al. 1970). All chickens were clinically healthy at the end of the feeding period. Average Hg level in the chicken feed was 8 mg/kg, and in the chicken skeletal muscle was 10 mg/kg. Muscle and liver from the chickens were fed to goshawks. Intake of Hg by the goshawks was 0.7 to 1.2 mg/kg BW/day. Clinical symptoms of Hg poisoning appeared after two weeks. All birds were dead 47 days after the start of the experiment. Muscle Hg levels of the goshawks averaged 40 to 50 mg/kg, representing a concentration factor of 4 to 5 in the second link of the food chain. Brain Hg levels in the dead goshawks ranged from 30 to 40 mg/kg.

Red-tailed hawks were fed chicks contaminated with methylmercury (Fimreite and Karstad 1971). The chicks were fed diets containing Panogen 15, a commercial seed treatment containing 2.5 percent methylmercury dicyandiamide (MMD) at rates of 6, 12 and 18 mg/kg MMD for 3 weeks. Mercury levels measured in chick livers were 3.9, 7.2 and 10.0 mg/kg, respectively. Mean estimated intakes of Hg by the 3 groups of hawks over the 12 week exposure period were 0.575 mg Hg/day; 1.12 mg Hg/day; and 1.46 mg Hg/day, respectively. Mortality occurred in hawks receiving the most contaminated diet (1.12 mg/kg BW/day) after an exposure period of one month or more. Pathological changes noted in all hawks which received the highest Hg doses included swelling of axons of myelinated nerves in the spinal cord, and dilatation of myelin sheaths and loss of myelin.

Barr (1986) conducted a field study of common loons (*Gavia immer*) nesting on the Wabigoon-English River systems, areas affected by unpredictable water level fluctuations and Hg contamination. It was noted that nesting success of loons in this area was suppressed. Water level fluctuations due to the dams were ruled out as a causative factor, as decreased nesting success was observed in lakes experiencing only natural water level changes as well. A strong negative correlation was found between the successful use of territories by breeding loons and Hg contamination. A reduction in egg laying, and nest site and territorial fidelity were associated with mean Hg concentrations ranging from 0.3 to 0.4 mg/kg in prey, and from 2 to 3 mg/kg in adult brain tissue and eggs. Loons established few territories, laid only one egg, and raised no young where mean Hg in prey species exceeded 0.4 mg/kg. Non-mercury toxicants were found in loons and prey items at low levels, and were discounted as a major factor in the failure of loon reproduction.

A dietary dose of 0.1 mg/kg BW/day (0.3 mg/kg) was used as a LOAEL. This value was converted to a NOAEL of 0.01 mg/kg BW/day by dividing by a factor fo 10. These values were used in food chain exposure models for kingfisher and red-tailed hawk.

4.7 Nickel

The literature was reviewed to locate a NOAEL based on the dietary ingestion of Ni to a fish species. A NOAEL based on the dietary ingestion of Ni was not located. Therefore, a hazard quotient based on a food chain accumulation model for smallmouth bass was not calculated.

Several studies were available which determined the effects of Ni ingestion to mammals. Wistar rats fed Ni sulfate indicated a NOAEL of 187.5 mg/kg/day to most systems except for body weight. This level of Ni sulfate caused a 27 to 29 percent decreased body weight (Ambrose et al. 1976). In a similar study with a beagle, a NOAEL of 62.5 mg/kg/day was noted (Ambrose et al. 1976). A dietary dose of 62.5 mg/kg BW/day was used as a NOAEL. This value was converted to a LOAEL of 625.0 mg/kg BW/day by multiplying by a factor of 10. These values were used in food chain expsoure models for raccoon, mink, and red fox.

The literature was reviewed to locate a NOAEL based on the dietary ingestion of Ni to an avian

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species. A NOAEL based on the dietary ingestion of Ni was not located. Therefore, a hazard quotient based on a food chain exposure model for woodcock, red-tailed hawk, and kingfisher was not calculated.

4.8 Zinc

The literature was reviewed to locate a NOAEL based on the dietary ingestion of Zn to a fish species. A NOAEL based on the dietary ingestion of Zn was not located. Therefore, a hazard quotient based on a food chain accumulation model for smallmouth bass was not calculated.

A study conducted on dogs, indicated that 1,000 mg/kg (25 mg/kg BW/day) caused no effects after one year (NAS 1979). A dietary dose of 25 mg/kg BW/day was used as a NOAEL. This value was converted to a LOAEL of 250 mg/kg BW/day by multiplying by a factor of 10. These values were used in food chain exposure models for raccoon, mink, and red fox.

Several studies were available which determined the effects of ingested Zn to birds. A concentration of 144.5 mg/kg/day caused a decrease in growth and anemia in chickens (Stahl et al. 1989). In a similar study conducted on chickens, a concentration of 361 mg/kg/day caused a reduction in body weight (Dean et al. 1991). In a study conducted on Japanese quail, a concentration of 139 mg/kg/day caused 7 percent mortality in chicks and reduced food intake (Hill and Camardese 1986). A dietary dose of 139 mg/kg BW/day was used as a LOAEL. This value was converted to a NOAEL of 13.9 mg/kg BW/day by dividing by a factor of 10. These values were used in food chain exposure models for belted kingfisher, American woodcock, and red-tailed hawk.

4.9 Polychlorinated Biphenyls

Monosson et al. (1994) tested the reproductive effects of a single PCB (3,3',4,4'-tetrachlorobiphenyl) on the white perch (*Morone americana*). The doses were administered as 3 intraperitoneal injections with three weeks between injections (six weeks total). Each low dose contained 0.2 mg/kg BW, each medium dose contained 1.0 mg/kg BW, and each high dose contained 5.0 mg/kg BW. To express these doses in mg/kg BW/day for the purposes of this risk assessment, the 3 individual doses were added and then divided by the total time period of dosing (42 days). The following total doses as mg/kg BW/day were calculated using this method: 0.014 mg/kg BW/day, 0.071 mg/kg BW/day, and 0.355 mg/kg BW/day. Blood and oocyte samples were taken six weeks after the final injection. Endpoints included percent mature females as indicated by oocyte diameter; gonad weight; blood plasma levels of steroid hormones (estradiol-17β and testosterone) and vitellogenin; hatching success; larval survival; and growth of embryos and larvae.

The high dose (0.071 mg/kg BW/day) reduced the proportion of mature females. The control and low and medium doses exhibited similar results (66 to 69 percent mature). The high dose had only 25 percent mature females which was significantly less than the control ($p<0.01$). Gonad weight was significantly reduced in both males and females in the high dose group. No significant difference was noted at the low and medium doses for gonad weight. No significant differences were noted in any of the blood plasma levels of steroid hormones or vitellogenin over the range of treatments. Hatching rate, viability of embryos, initial larval length, and 5-day larval length were not statistically different between treatment groups. However, larval survival was significantly lower after seven days in the medium and high treatments. Percent survival was 54 percent in the control, 20 percent in the low treatment, and zero and 1 percent in the medium and high treatments, respectively. A dietary dose of 0.071 mg/kg BW/day was used as a LOAEL. This value was converted to a NOAEL of 0.007 mg/kg BW/day by dividing by a factor of 10.

These values were used in food chain exposure models for smallmouth bass.

Several studies were found pertaining to the dietary toxicity of PCBs to mink, most of which examined its effects on reproduction, growth and survival. Mink are one of the most sensitive organisms to the effects of PCBs (Giesy et al. 1994). Studies were not available to red fox or raccoon, therefore, the values selected for use in the food chain exposure model for mink will also be used for red fox and raccoon. Reproductive effects are seen at parent dietary levels as low as 0.13 mg/kg BW/day (Heaton et al. 1995) and embryotoxicity at parent dietary levels of 0.66 mg/kg BW/day (Aulerich and Ringer 1977). Some adult mortality and behavioral effects are seen at dietary levels starting at 0.148 mg/kg BW/day (Platanow and Karstad 1973), reduced adult weight at dietary levels starting at 1.31 mg/kg BW/day (Aulerich and Ringer 1977), and complete adult mortality at dietary levels starting at 3.3 mg/kg BW/day (Aulerich and Ringer 1977).

Male and female ranch-bred mink were acclimated to a diet consisting of ocean fish scraps, commercial mink cereal, and meat by-products. Ocean fish scraps made up 40 percent of this diet. Dietary treatment levels were prepared by substituting 10, 20, and 40 percent of the ocean fish scraps with PCB-contaminated carp. The mean dietary PCB concentrations were 0.015 mg/kg (control), 0.72 mg/kg (10 percent carp), 1.53 mg/kg (20 percent carp), and 2.56 mg/kg (40 percent carp). Groups of 15 mink (3 males, 12 females) were assigned to one of the four treatment groups for a period of 12 weeks. Mink receiving the highest PCB-containing diet (40 percent carp or 0.32 mg/kg BW/day, as reported by the investigators) exhibited a 42 percent reduction in mean litter size, 86 percent fewer live kits at birth, and no kits surviving beyond 24-hours post-partum. Even mink receiving the 10 percent carp diet (or 0.13 mg/kg BW/day, as reported by the investigators) exhibited a 67 percent reduction in kits surviving three to six weeks relative to the control (Heaton et al. 1995).

One-year-old mink were fed a diet of beef and cereal prepared from cows which had been given 10 consecutive daily oral doses of 1 and 10 mg/kg of Aroclor 1254 dissolved in an olive oil and dairy concentrate (Platanow and Karstad 1973). The cows did not exhibit any clinical, gross, or histopathological signs of PCB toxicity. The cows were killed 24 hours following the last dose, and the musculature, liver, and kidneys ground and mixed with commercial mink food cereal at a level of 24 percent cereal. The resulting rations containing 0.64 and 3.57 mg/kg of total PCB were fed to mink for a period of 160 days. The mink were fed this diet *ad libitum* 2 months prior to the breeding season and continued for 160 days. All 16 mink that were fed 3.57 mg/kg of PCBs died by day 105. Two of the 16 mink that were fed 0.64 mg/kg died by days 122 and 129. The mink exhibited poor appetites, lethargy, and weakness before dying. Some passed tarry feces, indicating gastrointestinal hemorrhaging. At both treatment levels, males survived longer than females. These doses were converted to a daily exposure concentration by multiplying them with the inverse of the lowest reported body weight of the mink (0.52 kg) and the food ingestion rate of the mink (0.121 kg/day). This yielded exposure concentrations of 0.148 and 0.785 mg/kg BW/day for the 0.64 and 3.57 mg/kg dose, respectively.

Eight month old mink fed a basal diet containing 1.0 mg/kg of Aroclor 1254 for a period of approximately six months exhibited no mortality or any significant changes in the thyroid, pituitary, adrenal glands, or serum T3 and T4 levels (Wren et al 1987a). Reproduction and kit development was evaluated under the same test conditions in a separate study (Wren et al. 1987b) by the same investigators. Male fertility and female offspring production were not affected by the 1.0 mg/kg Aroclor 1254 diet. However, growth rate of kits nursed by exposed mothers was significantly reduced. The investigators estimated the daily exposure concentrations to be 0.10 mg/kg BW/day for males and 0.18 mg/kg BW/day for females.

In a preliminary study to determine the cause of reproductive complications in mink fed Great

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Lakes fish, adult breeder mink were fed a basal diet supplemented with 30 mg/kg of PCBs for six months (181 days). However, all of the mink died emaciated by the end of the experimental period (Aulerich and Ringer 1977). For this risk assessment, the 30 mg/kg dose was converted to a daily exposure concentration by multiplying it with the inverse of the lowest reported body weight for the mink (0.52 kg) and the food ingestion rate (0.121 kg/day) to yield an exposure concentration of 6.6 mg/kg BW/day.

As a result of this preliminary study, a long-term study was conducted to ascertain the effects of long-term, low-level consumption of PCBs on growth. Mink were fed a basal diet supplemented with 5 and 10 mg/kg of PCBs for a period of approximately 8.5 months. The basal diet plus 10 mg/kg of PCBs resulted in a significant 56 percent decrease in body weight gain after a period of 4 months. Body weight gain was reduced by 39 percent in the 5 mg/kg treatment group, but this reduction was not significant. Both the 5 and 10 mg/kg treatment groups failed to produce offspring; the control group produced 17 live and 8 dead kits. Various degrees of embryotoxicity were observed during necropsy of the treated animals (Aulerich and Ringer 1977). The 5 and 10 mg/kg doses were converted to a daily exposure concentration by multiplying it with the inverse of the lowest body weight reported by the investigators for this treatment group (0.923 kg) and the food ingestion rate (0.121 kg/day) of the mink. This yielded exposure concentrations of 0.66 and 1.31 mg/kg BW/day for the 5 and 10 mg/kg treatment group, respectively.

Based on the results of this experiment, another experiment was conducted to determine the effects of long-term consumption of low-level PCBs on reproduction. Fifteen mg/kg of PCB as Aroclor 1254 in the diet resulted in a complete inhibition of reproduction and 31 percent adult mortality, compared to 6 percent mortality in the controls. Five mg/kg of Aroclor 1254 resulted in a 95 percent reduction in the number of kits born live; the ratio of live kits to female adults was reduced by 87 percent. However, in an effort to determine the persistency of the impaired reproductive condition, 11 adult females that received 5 mg/kg of Aroclor 1254 for a period of six months were placed on a control diet for one year. The results indicate that the impaired reproductive performance of these females was not a permanent condition (Aulerich and Ringer 1977). The 5 and 15 mg/kg dose was converted to a daily exposure concentration by multiplying it with the inverse of the lowest reported body weight for the mink [and the food ingestion rate (0.121 kg/day)] to yield exposure concentrations of 1.1 and 3.3 mg/kg BW/day, respectively.

A dietary dose of 0.13 mg/kg BW/day of PCBs (Heaton et al. 1995) was used as a LOAEL. A NOAEL of 0.10 mg/kg BW/day (Wren et al. 1987b) was used. These values were used in food chain exposure models for mink, red fox, and raccoon.

Delayed reproduction was reported in ringed turtle doves fed a diet of 10 mg/kg Aroclor 1254 (1.3 mg/kg BW/day) for 3 months (Heinz et al. 1984). Another study investigated the behavioral component of reproduction in mourning doves given dietary supplements of 0, 10, or 40 mg/kg Aroclor 1254 (0, 0.9 mg/kg BW/day, 3.5 mg/kg BW/day) (Torre and Peterle 1983). Control doves displayed normal courtship behaviors and patterns (Torre and Peterle 1983). Doves that were fed at the 10 ppm supplemental level spent twice as much time in the courtship phase as the control birds, with only 50% completing courtship and nesting (Torre and Peterle 1983). Of the 50% that did nest and incubate eggs, nest initiation was significantly delayed. None of the doves on the 40 ppm dietary supplement completed the nesting process (Torre and Peterle 1983). It was hypothesized that the decline of reproductive activity was induced by the degradation of estrogen and androgen present in the birds which is presumably a result of increased hepatic microsomal enzyme activity due to the presence of PCBs (Eisler 1986b). Hatchability of chicken eggs was reduced in hens fed a diet which was supplemented with 20 mg/kg of total PCBs (3.5 mg/kg BW/day); reproductive impairment was observed at supplemental dietary levels as low as 5 ppm (0.9 mg/kg BW/day)(Heinz et al. 1984). Pheasants fed a diet of 50 mg/kg Aroclor 1254 (3.2

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mg/kg BW/day) weekly laid significantly fewer eggs than control birds (NAS 1979). A dietary dose of 0.9 mg/kg BW/day (from both studies on mourning dove and chicken) was used as a LOAEL. This value was converted to a NOAEL of 0.09 mg/kg BW/day by dividing by a factor of 10. These values were used in food chain exposure models for American woodcock and belted kingfisher.

American kestrels fed a diet of 9-10 mg/kg BW/day of Arochlor 1254 for a period of 62-69 days, showed a marked decrease in sperm concentration (Bird et al. 1983). American kestrel and red-tailed hawk are both predatory species. Predatory birds might consume enough PCBs to alter semen quality, which in conjunction with courtship behavioral disorders, might be disastrous in some breeding areas. Therefore, a dietary dose of 9 mg/kg BW/day was used as a LOAEL. This value was converted to a NOAEL of 0.9 mg/kg BW/day by dividing by a factor of 10. These values were used in food chain exposure models for red-tailed hawk.

5.0 METHODS

5.1 Investigative Strategy

A field investigation was conducted to obtain site-specific contaminant concentrations in water, sediment, soil, and biological tissue that would address the data gaps identified in the preliminary risk assessment and provide data necessary for the completion of a baseline risk assessment for the site. These data gaps were addressed as follows:

Data Gap: Site-specific tissue concentrations were not available.
Strategy: Earthworms, small mammals, fish, and clams were retained for chemical residue analysis of bioaccumulative contaminants (PCBs, metals). These site-specific tissue residue levels were used to predict the amount of contaminant transfer through trophic levels and subsequently, effects to the ecological functioning of the system.

Data Gap: Limited literature-based toxicity information was available for several of the contaminants of concern identified in the preliminary risk assessment.
Strategy: An extensive literature search was conducted for literature-based toxicity information.

In addition to addressing the data gaps, the following investigative strategies were employed to complete a final risk assessment for this site. Solid- and aqueous-phase toxicity evaluations were conducted to determine the effects of direct contact with site contaminants to terrestrial and aquatic organisms. The underlying premise of these toxicity evaluations was that the organism response can be associated with the contaminant levels measured by the chemical analyses. This premise applies to those contaminants that are considered direct toxins, not bioaccumulative or not bioconcentrated (e.g., volatile organic compounds, semi-volatile organic compounds, most metals, and certain pesticides).

To address the contaminants that are generally considered bioaccumulative and bioconcentrated (e.g., PCBs) and those that are moderately bioaccumulative but not bioconcentrated (e.g., Cu, Pb, and Zn), tissue residue levels in the earthworms from the solid-phase soil toxicity evaluation, and from the small mammal and fish collection, were used to predict contaminant transfer to higher trophic levels.

5.2 Technical Approach

5.2.1 Site Reconnaissance

A site reconnaissance was conducted prior to sampling activities to familiarize the field crew members with the physical characteristics of the site. This information was used in conjunction with site maps to locate the general sampling locations for the study. Locations were selected to provide samples from the river, on-site basins, and other terrestrial locations (Figure 2, Table 1).

5.2.2 XRF Screening/PCB Screening

Soil and sediment were screened for metals in the field using 2 Spectrace 9000 field-portable X-ray fluorescence (XRF) analyzers. The purpose of the screening was to confirm the presence of contaminants in areas selected during the site reconnaissance as potential sampling locations and to determine a concentration gradient. The Spectrace 9000 was utilized for bench top screening using prepared (i.e., dried and sieved) sample cup methods. Screening was conducted in accordance with ERTC/REAC Standard Operating Procedure (SOP) #1713, *Spectrace 9000 Field Portable X-ray Fluorescence Operating Procedure*. Replicate analyses were run on approximately 10 percent of the samples. The results of the replicate analyses were used to determine the instrument precision. A minimum of 10 percent of the screened samples were retained for laboratory confirmation by a U.S. EPA-approved method using Atomic Absorption (AA) or Inductively Coupled Plasma (ICP) analyses. The laboratory values were compared to the XRF values using regression analysis. A coefficient of determination (r^2) value greater than 0.70, as stated in the U.S. EPA/ERTC Quality Assurance Technical Information Bulletin (Vol. 1, No. 4, May 1991), indicates an acceptable level of correlation between the two methods and qualifies XRF data as Quality Assurance Level 2 (QA-2) data.

From 11 to 14 May 1997, 37 soil and sediment samples were collected for XRF analysis. The samples were collected using a decontaminated stainless steel or plastic trowel. The sample was placed into a plastic bag and transported to the staging area. At the staging area, the sample was relinquished to the field chemists for processing and analysis.

To determine the concentration of PCBs from several locations throughout the property, a select number of the soil and sediment samples that were collected for XRF analysis were chosen for PCB analysis. From 11 to 12 May 1997, 12 soil and sediment samples were collected for PCB analysis. The samples were placed into an 8-ounce glass jar, labeled, and transported to HPE Environmental Service, Falls Church, VA. The samples were analyzed for Aroclor 1248 method and the results were received on 13 May 1997.

5.2.3 Surface Water Sampling (Basins, River)

Surface water samples were collected from seven river locations (except Location BMI-6) and from five basins located on site (Figure 2). In addition, a water sample was collected from Location BMI-4 following the start-up of the waste water treatment plant (Sample No. 604). Surface water samples were collected directly into the appropriate sample container as per ERTC/REAC SOP #2013, *Surface Water Sampling*. Water samples were collected prior to collecting sediment samples and upstream of any stream disturbances caused by the sampler. Samples analyzed for metals were preserved by adding 40 percent nitric acid until a pH of less than 2 was obtained. Surface water samples were submitted for TAL metals, Target Compound List (TCL) Pest/PCBs, and TCL VOCs analyses. In addition, water samples were collected from the basins for toxicity testing using *C. dubia* and *P. promelas*.

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Water quality parameters were measured using an Horiba® Water Quality Management System. The Horiba was used to measure temperature in degrees Celsius (°C), pH, dissolved oxygen [milligrams per liter (mg/L)], conductivity [millimhos per centimeter (mmhos/cm)], turbidity [nephelometric turbidity units (NTUs)], and salinity [parts per thousand (ppt)]. The Horiba was calibrated prior to data collection and after data collection was completed. In-situ water quality data were transcribed from the digital display of the Horiba into a field logbook at the time of collection. The Horiba was used in accordance with the manufacturer's operating manual.

5.2.4 Surface Sediment Sampling (Basins, River)

Surface sediment samples were collected at eight river sample stations and from five basins located on site (Figure 2). In addition, a sediment sample was collected near Viscose Basin No. 1 in an area that contained run-off material from the basin (Sample No. 608).

All sediment sampling was conducted according to ERTC/REAC SOP #2016, *Sediment Sampling*. At each sample station, sediment was collected from the top six inches of sediment using a decontaminated ponar dredge, bucket auger, or trowel. The sample was composited into a decontaminated 5-gallon plastic bucket, homogenized, and divided into the appropriate sample containers for chemical analyses. All sediment samples were screened in the field for metals using the Spectrace 9000 XRF analyzer. The sediment samples collected from the river were submitted for TAL metals, TCL Pesticides/PCBs, TCL VOCs, TOC, and grain size analysis. The sediment samples collected from the basins were additionally analyzed for TCL BNAs. In addition, sediment samples were collected for toxicity testing using *Hyallela azteca* and *Chironomus tentans.*

5.2.5 Surface Soil Sampling

Surface soil samples were collected at six sample locations on site (Figure 2). Surface soil samples were collected using a decontaminated stainless steel trowel or spoon from the top six inches of the soil according to ERTC/REAC SOP #2012, *Soil Sampling*. All soil samples were analyzed for TCL VOCs, TAL metals, TCL Pest/PCB, TCL BNAS, grain size, and TOC. In addition, soil samples were collected for toxicity testing using *E. foetida.*

5.2.6 Mammal Trapping and Processing

Small mammals were collected from the site to determine tissue levels of metals and Pest/PCBs and to evaluate histopathological effects of exposure to site contaminants. The presence of elevated metal and PCB burdens in small mammals trapped on site would show that the contaminants are bioavailable and have the potential to cause ecological risk to terrestrial receptor species. All field trapping activities were conducted in accordance with ERTC/REAC Standard Operating Procedure SOP #2029, *Small Mammal Sampling and Processing*.

Four trapping areas were established on site as follows: the Fly Ash Pile, the Wetland Area, the Wastewater Treatment Plant area, and the Reference Area [located immediately adjacent to the staging area (Figure 2)]. The length of the trapping period and the trapping effort varied among each of the four trap areas and was based on the length of time and effort required to capture a sufficient number of mammals for statistical evaluation. Sampling was performed using Museum Special snap traps set in grids or lines as appropriate. All traps were spaced 10 feet apart and baited with a rolled oats and peanut butter mixture. The traps were checked twice daily, once in the morning and once in the evening. During trap checks, traps were rebaited as necessary. Recovered animals were labeled with the trap area, trap number, species, and date of capture while in the field and then were transferred in coolers to the staging area for processing.

For each animal, prior to performing the necropsy, data from the specimen label were transferred to a small mammal data sheet (Appendix A). Body metrics including total body weight, body length, tail length, ear length, liver weight, and kidney weight were measured and recorded on the data sheet. During the necropsy any abnormalities were noted and the contents of the gastrointestinal tract were removed from each specimen. Sections of the kidney and liver (approximately 0.5 g each) were removed for histopathological analyses. The sections were placed in a labeled 40-mL glass vial and preserved with 10 percent neutral buffered formalin. The preserved sections for all mammals were submitted to Animal Reference Pathology (ARP) for histopathological evaluation. The remaining tissue was homogenized for TAL metals and Pest/PCB analysis.

In addition to mammals, a soil sample was collected from each of the trapping grid. The same identifier was used on these samples as on the mammals (e.g., Fly Ash Pile, Wetland Area, Wastewater Treatment Plant and Reference).

5.2.7 Benthic Macroinvertebrate Collection and Processing

Benthic macroinvertebrates were sampled in the South Fork of the Shenandoah River to determine if contaminants released into the river are impacting the benthic invertebrate community, which in turn may impact the health and function of the entire aquatic system (e.g., fisheries). Changes in benthic macroinvertebrate communities among sample stations were evaluated to determine if these changes are related to contaminants or other abiotic or biotic factors.

Benthic macroinvertebrates were sampled per draft ERTC/REAC SOP # 2032 *Benthic Macroinvertebrate Sampling*, and U.S. EPA (1989 and 1990). Specific key habitat variables, such as substrate and basin morphology were characterized and documented in field logbooks (Appendix B). A long-handled, D-frame net, measuring approximately 45 centimeters (cm) wide and 20 cm tall, with 0.5 millimeters (mm) mesh was used. The upper straight portion of the frame was positioned firmly on the substrate with the net extended in a downstream direction by the current. A sampling area of approximately 1 square meter was established immediately upstream of the net. The stream bottom within this area was disturbed for 60 seconds by overturning rocks and substrate to a depth of approximately 5 cm; dislodged organisms were swept into the net by the current. Three replicate samples were collected at each sample location. The net contents were transferred to a labeled polypropylene sample container and preserved with 70 percent isopropyl alcohol. To prevent damage to the organisms during transport, large debris, stones, and other extraneous material were removed after ensuring that they were free of attached or clinging organisms. Organisms clinging to the net fabric were removed with forceps and added to the container. The invertebrate samples were shipped to the REAC Biological Assessment Laboratory in Edison, NJ for sorting. The invertebrate were then placed into 40 milliliter (mL) glass vials and shipped to Symbiosis, Inc., Riegelsville, PA for identification.

In the laboratory, the samples were rinsed in clean water and placed in a white 12 by 18-

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inch polyethylene pan. Just enough water was added to allow complete dispersion of the material within the pan. Samples too large to be sorted in a single pan were transferred in small aliquots until the entire sample was processed. Large debris, stones, and other extraneous material were removed from the tray and inspected for attached or clinging organisms. All organisms picked from the pan were identified to the lowest positively identified taxonomic level, enumerated, and recorded on a laboratory bench sheet. The size and life history stage of the organisms and state of taxonomic knowledge of the taxa determined the level of identification. The organisms were identified using appropriate taxonomic references (Edmunds et al. 1976; Wiggins 1977; Pennack 1978; Merritt and Cummins 1984; Peckarsky et al. 1990) and a representative subsample was identified by a second individual to meet the QA/QC requirements of the taxonomic analysis.

Benthic macroinvertebrate community structure was summarized utilizing several numeric and ecological parameters including: a) number of individuals; b) number of species; and, c) a descriptive summary of functional feeding groups. For the last parameter, an organism was classified or placed into a group based on morphological mechanisms of food acquisition, behavioral characteristics, and physical/biochemical characteristics of the food item (Cummins and Klug 1979 and Merritt and Cummins 1984). Taxa were assigned a feeding group based on literature descriptions of mouth parts, gut contents, and ecology. In some cases, the degree of taxonomic resolution did not permit the placement of a taxa into a single group. In this case, fractional shares for that taxa were assigned to each potential feeding group (Barbour and Cummins 1989). Poor taxonomic resolution, coupled with the diversity of feeding groups, excluded the Chironomidae from this analysis.

Five functional feeding groups were considered, including shredders, collector-filterers, collector-gatherers, scrapers, and predators. Shredders consume coarse particulate organic matter composed primarily of decomposing vascular plant material. The microflora associated with this material is an important component of the total energy assimilated by this group. Collectors feed on fine particulate organic matter either by filtering this material from the water column, or by gathering it from deposits and sediments. Scrapers possess specialized mouth parts that enable them to feed on periphyton. The periphyton community grows on submerged mineral and organic substrates and is composed of bacteria, protozoa, and algae. Predators are secondary consumers that feed on animal tissue.

Sediment and water samples were also collected from each of these locations. The sample identifier was the same as used on the benthic samples (e.g., Reference No. 1, Reference No. 2, and BMI-1 through BMI-5). Water samples were not collected from location BMI-6. These sample locations also corresponded with the location of outfalls assocaiated with the site.

5.2.8 Fingernail Clam Collection and Processing

The Work Plan prepared for the Risk Assessment specified the collection of an invertebrate species from each benthic macroinvertebrate location for chemical analysis. The species targeted was the crayfish. However, efforts in the field indicated that the collection of crayfish would not be possible. It was noted that there were many fingernail clam at each sampling location. Therefore, a decision was made in the field to collect the fingernail clam, and to use the tissue data in place of the crayfish. The sampling crew manually collected clams at each of the benthic macroinvertebrate sampling locations. The clams were transported to the staging area where they were placed into buckets or coolers. Sufficient water was added to cover the clams and an air stone placed into the bucket. The clams were allowed to depurate overnight. The following day, the clams were removed from the chamber and the shells were removed. The soft-tissue was placed into an 8-ounce glass jar. The jar was shipped to the REAC Biological Laboratory in Edison, NJ. In the lab, the contents of the jar were weighed and separated for analysis. The purpose of this effort was to provide as many analyses as possible from each location. This method allowed for two replicate analysis for TAL metals and Pest/PCBs from each location, with the exception of location BMI-4. This location only contained sufficient mass for one chemical analysis.

Sediment and water samples were also collected from each of these locations as discussed in Section 5.2.7.

5.2.9 Fish Collection and Processing

Fish were collected from 12 to 13 May 1997 from the South Fork of the Shenandoah River. The fish sampling crew conducted a site reconnaissance of the river to determine appropriate sample locations. The stations were selected based on their proximity to site outfall. Five locations, including an upstream reference station, were selected within the river for the collection of fish. The targeted species were sunfish (previous data indicated that redbreast sunfish were available) and carp. Carp were selected to provide comparison for the species collected within the on-site basins.

A combination of backpack and boat-mounted electroshockers were used to collect fish from the river. A Coffelt Mark X backpack shocker was used at the reference location (upstream near the public boat ramp). The backpack shocker is powered by a small generator mounted in the backpack. A hand held anode probe and rattail cathode set up the field in the water. A Coffelt Mark XX boat shocker was used at the other locations. The boat shocker includes a stainless steel sphere anode connected to an articulated arm mounted to the bow of the boat. A 5000 watt Honda generator supplied power to the shocking unit. The boat was pushed at each station by a member of the field crew while the other field member operated the dead-man switch from the boat. This allowed us to position the anode over appropriate structure and cover encountered along the bank. The current and shallow water made it difficult to use the motor to navigate with any precision.

During each shocking run, all sunfish collected were netted and placed in live wells. All other fish were released immediately. Throughout the effort, we attempted to collect carp from the river, but were unable to collect these fish.

On 12 May 1997, fish were collected at the reference area and then the field crew launched the boat shocker and drifted downstream to the large brick structure (BMI-1). The field crew worked at least 50 m on both sides (upstream and downstream of the brick building).

On 13 May 1997, the field crew launched the boat and drifted downstream to the farthest station downstream (BMI-6). This location was approximately 750 m downstream of the wastewater treatment outfall. Sunfish were collected within a 50-m section of bank under various cover types and structure. The field crew then proceeded to the waste water treatment plant discharge (BMI-4). Fish were collected primarily within 25 m downstream of the discharge in the small back water area created just downstream of the discharge. A few fish were collected just upstream of the discharge (within 20 meters).

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The next station was approximately 500 m upstream of the waste water treatment plant (BMI-2). It only took about 50 to 75 m of stream bank to provide enough structure to capture the required number of sunfish.

All fish were brought back to the staging area in live wells or buckets and transferred to larger aerated coolers. The sunfish were allowed to depurate overnight. The following day, the fish were sacrificed, and total length, standard length, and weight were recorded for each fish selected. The fish were then wrapped in aluminum foil and placed into zip-lock plastic bags. The fish were frozen and shipped to the REAC Biological Laboratory in Edison, NJ. The whole body fish was analyzed for TAL metals and Pest/PCBs. Eight redbreast sunfish were collected from each location (BMI-1 contained seven replicate sunfish).

Fish were also collected from Sulfate Basin No. 5. A sediment sample collected from this basin, and analyzed using XRF, contained 160,000 mg/kg zinc. Therefore, the fish collected from this basin were assumed to provide a worst case estimate of the exposure to zinc.

On 12 May 1997, two gill nets were set in the basin. One net was set parallel to the shoreline, and the second net was set perpendicular to the shore. Both nets contained 10 ft panels with mesh sizes ranging from ½ inch to 4 inches, and each net was approximately 100 ft long. The nets were deployed by tying one end to a stationary object and then slowly backing the boat away from the shore. When the net was fully set, the other end was tied to a float and a weight. The nets were allowed to remain in the water for several hours prior to checking. During the set, seven carp were collected from Sulfate Basin No 5. All fish were captured live and transported to the staging area. The fish were placed in coolers and allowed to depurate overnight. The following day, the fish were sacrificed, and total length, standard length, and weight were recorded for each fish. The fish were then wrapped in aluminum foil and placed into a ziplock bag. The fish were shipped to the REAC Biological Laboratory in Edison, NJ for analysis. Each fish was analyzed for TAL metals and Pest/PCBs.

One gill net was also set on 14 May 1997 in Fly Ash Basin No. 6. This net was long enough to stretch across the basin. This net was placed for approximately 24 hours. During this time, no fish were captured in the net. No other fish were captured from the on-site basins.

Sediment and water samples were collected from reach river location as discussed in Section 5.2.7. Sediment and water samples were also collected from Sulfate Basin No. 5. These samples were used in the food chain exposure models.

5.2.10 Toxicity Test Evaluation

A series of laboratory toxicity evaluations were conducted to assess the toxicity of site contaminants to ecological receptors and to address the following assessment endpoints:

- Protection of benthic invertebrate communities to maintain species diversity and nutrient cycling (trophic structure), and to provide a food source for higher level consumers.

- Protection of fish communities to insure that direct exposure and ingestion of contaminants by forage fish and invertebrates does not have a negative impact on growth, survival, and reproductive success. Additionally, to insure that contaminant levels accumulated in fish tissues are low enough to minimize the risk of accumulation and negative effect in higher trophic levels.

- Protection of soil invertebrate communities to maintain species diversity and nutrient cycling (trophic structure), to provide a food source for higher level consumers, and to insure that contaminant levels in soil invertebrate tissues are low enough to minimize the risk of bioaccumulation and/or other negative toxic effects in higher trophic levels.

The series of toxicity evaluations selected to address these endpoints were as follows:

For aqueous matrices:

- 7-day toxicity evaluation using the cladoceran, *Ceriodaphnia dubia*
- 7-day toxicity evaluation using the fathead minnow, *Pimephales promelas*

Water samples were collected from Sulfate Basin No. 1, Sulfate Basin No. 5, Fly Ash Basin No. 6, Emergency Pond, and the Polishing Pond for testing using *C. dubia* and *P. pimephales*. The endpoints for the test using *C. dubia* were survival and neonate production. The endpoints for the test using *P. pimephales* were survival and growth (body weight).

For sediment:

- 10-day toxicity evaluation using the amphipod, *Hyallela azteca*
- 10-day toxicity evaluation using the midge, *Chironomus tentans*

Sediment samples were collected from Sulfate Basin No. 1, Sulfate Basin No. 5, Fly Ash Basin No. 6, Emergency Pond, and the Polishing Pond for testing using *H. azteca and C. tentans*. The endpoints for these evaluations were survival and growth (measured as body length and body weight).

For soil:

- 14- and 28-day toxicity evaluation using the earthworm, *Eisenia foetida*

Soil samples were collected from the Reference Area, Wetland Area, Wastewater Treatment Plant Area, Fly Ash Pile, and the PCB Spill Area. The endpoints for this evaluation were survival and growth (measured as body weight). Surviving organisms from the 28-day earthworm evaluation were submitted for laboratory analysis of Pest/PCBs and TAL metals.

Survival and growth data generated in the sediment and soil tests were evaluated for normality and homoscedasticity prior to analysis. If the assumptions of normality and equal error variances were met, the data were analyzed with an analysis of variance. This analysis was followed up by the Duncan's Multiple Range Test and the Dunnett's t-test to determine statistical significance. Mean survival and growth data were then correlated with mean soil and sediment contaminant levels. Since direct contact with contaminated water in the toxicity evaluation is the primary route of exposure for fathead minnows in this risk

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assessment, the results of the test will be used to indicate adverse exposure levels using a Pearson correlation procedure.

5.2.11 Sampling Equipment Decontamination

The following sampling equipment decontamination procedure was employed prior and subsequent to sampling each station in the following numerical sequence:

1 physical removal
2 nonphosphate detergent wash
3 potable water rinse
4 10% nitric acid rinse
5 distilled water rinse
6 acetone rinse
7 distilled water rinse
8 air dry

5.2.12 Sample Documentation and Packaging

Sample documentation was completed per the following ERTC/REAC SOPs:

- ERTC/REAC SOP #2002, *Sample Documentation*
- ERTC/REAC SOP #4005, *Chain of Custody Procedures*

Sample packaging and shipment was conducted in accordance with the following ERTC/REAC SOP:

- ERTC/REAC SOP #2004, *Sample Packaging and Shipment*

5.2.13 Sampling Techniques

Field sampling techniques were conducted in accordance with the following ERTC/REAC SOPs:

- ERTC/REAC SOP #2012, *Soil Sampling*
- ERTC/REAC SOP #2013, *Surface Water Sampling*
- ERTC/REAC SOP #2016, *Sediment Sampling*

6.0 RESULTS

Sediment and soil samples were screened in the field using XRF. The validation report for these results is included in Appendix C. The remainder of the sediment, soil, water, and tissue samples were sent to the REAC Laboratory, Edison, NJ. The final results for these analyses are included in Appendix D.

6.1 Field Screening Results

6.1.1 XRF Results of Metals in Soil/Sediment

A total of 37 soil/sediment samples were screened in the field for Zn, Pb, Cu, Cr, As, Cd, and Fe. The results indicate that Zn ranged from undetected to 160,000 mg/kg (Sulfate Basin No. 5). Lead ranged from undetected to 230 mg/kg, Cu ranged from undetected to 140 mg/kg, and As ranged from undetected to 190 mg/kg. Chromium and Cd were not

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detected in any samples above the detection limits. The complete results of the XRF analyses are included in Appendix C.

6.1.2 PCB Screening Results

In order to locate area of PCB contamination, several sediment and soil samples were collected on 11 and 12 May 1997 and analyzed for Aroclor 1248. These samples were collected from 12 locations within the South Fork of the Shenandoah River upstream, adjacent to, and downstream of the site. In addition, soil samples were collected from near the Treatment Plant, the Wetland Area, the Fly Ash Pile, and the Reference Area.

Based on a QA review of the data, these results were determined to be invalid. However, sediment or soil samples were later collected from each of these locations and analyzed for total PCBs using a standard laboratory method. Therefore, no information was lost due to the rejection of the screening PCB results.

6.2 Results of the Chemical Analysis of Surface Water (Basins)

Water samples were collected from seven locations within the South Fork of the Shenandoah River and from five on-site basins. The samples were analyzed for VOCs, TAL metals, and Pest/PCBs. In addition, water quality parameters were measured at each location (Table 2).

6.2.1 Metals

Water samples were collected from five on-site basins and analyzed for TAL metals (Table 3). The water samples collected from Sulfate Basins No. 1 and No. 5 had 160 micrograms per Liter (ug/L) and 120 ug/L of Zn, respectively. Of the basins sampled, the Emergency Pond had the highest concentration of Zn at 1,700 ug/L. With the exception of Fly Ash Basin No. 6, all other on-site samples contained Zn above the MDL.

Aluminum was detected in all samples except in Sulfate Basin No 5. The highest concentration of aluminum (Al) was detected in the Polishing Pond at 940 ug/L. Calcium, Fe, magnesium (Mg), Mn, potassium (K), and sodium (Na) were detected in every sample. Antimony (Sb), beryllium (Be), Cd, Cr, cobalt (Co), Cu, Pb, Hg, Ni, selenium (Se), silver (Ag), thallium (Tl), and vanadium (V) were not detected in any water samples collected on site.

6.2.2 VOCs

No VOCs (including CS_2) were detected above the detection limit in any of the on-site surface water samples (Table 4).

6.2.3 Pesticides/PCBs

No Pest/PCBs were detected above the detection limit in any of the on-site surface water samples (Table 5).

6.3 Results of the Chemical Analysis of Surface Water (River)

6.3.1 Metals

[redacted]

Water samples were collected from seven locations within the South Fork of the Shenandoah River (Table 6). The samples collected from the river had fewer analytes detected than the samples collected from on-site basins. Aluminum and Zn were not detected above the detection limit in any river sample. Sixteen of the 23 analytes were not detected in the river samples and the remainder of the analytes [barium (Ba), Ca, Fe, Mg, Mn, K, and Na] were found at similar concentrations at all locations.

A water sample was collected at Outfall 004 prior to the start up of the treatment plant (Sample 414) and then immediately following the start up of the treatment plant (Sample 604, Table 6). The concentrations of Al, Fe, Mn, K, Na, and Zn increased following the start up of the plant. It should be noted that the Na concentration went from 8,100 milligram per Liter (mg/L) to 270,000 mg/L following the start up of the treatment plant. The concentrations of Ba, Ca, and Mg decreased following the start up of the treatment plant.

6.3.2 VOCs

No VOCs were detected above the detection limit in any of the river water samples. Acetone was detected at a low concentration in sample BMI-2. Carbon disulfide was not detected in the river water samples (Table 7).

6.3.3 Pesticides/PCBs

Water samples were collected from seven locations within the South Fork of the Shenandoah River. No Pest/PCBs were detected in any sample above the MDLs (Table 8).

6.4 Results of the Chemical Analysis of Surface Sediment (Basins)

6.4.1 Metals

Sediment samples were collected from the same on-site basins as the water samples (Table 9). In addition, a sediment sample was collected from an area adjacent to Viscose Basin No. 1 (Sample 608). Zinc levels were elevated in several of the on-site basins. The highest concentration of Zn was detected in Sulfate Basin No. 5 at 170,000 mg/kg. Sediment collected from Sulfate Basin No. I, the Emergency Pond, and the Polishing Pond contained 27,000 mg/kg, 44,000 mg/kg, and 43,000 mg/kg Zn, respectively.

Silver and Tl were the only metals not detected in sediment samples collected from the basins. Mercury was detected in all sediment samples, except at Sulfate Basin No. 5, ranging from 0.45 to 1.1 mg/kg (Table 9).

6.4.2 VOCs

Acetone and 2-butanone were detected in every sample (Table 10) collected from the on-site basins. The concentration of acetone ranged from 60 micrograms per kilograms (ug/kg) in the Viscose Creek to 470 ug/kg in Fly Ash Basin No. 6. The concentration of 2-butanone ranged from 13 ug/kg in Viscose Creek to 140 ug/kg in Fly Ash Basin No. 6. Several other VOCs were detected in the sediment samples. Benzene, toluene, xylenes, naphthalene, and trimethylbenzene were detected in several of the samples. The Emergency Pond contained the largest number of VOCs detected (10). Carbon disulfide was detected in low concentrations in the sediment of Sulfate Basin No. 5 (10 ug/kg) and the Emergency Pond (19 ug/kg). Carbon disulfide was not detected in any other sediment samples (Table 10).

6.4.3 Pesticides/PCBs

Pesticides were not detected in sediment samples collected from the on-site basins (Table 11). The sediment sample collected from the Polishing Pond contained 2,200 ug/kg Aroclor 1254 and 3,000 ug/kg Aroclor 1260. The sediment sample collected from the Emergency Pond contained 450 ug/kg Aroclor 1248 and 400 ug/kg Aroclor 1260. PCBs were not detected in any other sediment samples (Table 11).

6.4.4 Grain Size

Greater than 50 percent of the sediment composition was comprised of silt, clay, and colloids in the six sediment samples collected from the on-site basins. Sulfate Basin No. 5 contained 4.3 percent gravel and the Emergency Pond contained 0.1 percent gravel. No other sediment sample contained gravel. The remainder of the sediment was composed of sand. The percent sand ranged from 24 to 50.2 percent (Table 12). Additional information on grain size is located in Appendix E.

6.4.5 Total Organic Carbon

Sediment collected from the basins was analyzed for total organic carbon. Of the basins sampled, the Sulfate Basin No. 5 contained the highest percent of total organic carbon at 32.6 percent. The other basins all contained less than 13.8 percent organic carbon (Table 12).

6.5 Results of the Analysis of Sediment (River)

6.5.1 Metals

The concentrations of metals in the river are much lower than those found in the on-site basins (Table 13). For example, the highest Zn concentration detected in the river was 120 mg/kg at location BMI-5. This location is downstream of Outfall 004. The reference location (Reference 2), upstream of the site, had a Zn concentration of 78 mg/kg.

There are no trends with regards to decreasing or increasing metal concentrations in the sediment samples collected from the river (Table 13).

6.5.2 VOCs

Acetone was detected at all river locations except for the Reference 2 (the most upstream location). The concentration ranged from 14 ug/kg at Location BMI-3 to 800 ug/kg at Reference No. 1. Acetone was not detected in the field or trip blanks. In addition, 2-butanone was detected at the Reference location, BMI-4, and BMI-6. The only other VOC detected was toluene at the Reference location at 10 ug/kg, which is estimated below the detection limit. Carbon disulfide was not detected in any sediment sample collected from the South Fork of the Shenandoah River (Table 14).

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6.5.3 PCB/Pesticides

Pesticides were not detected in the sediment samples collected from the river (Table 15). Aroclor 1260 was detected at Location BMI-5 at a concentration of 470 ug/kg. No other PCBs were not detected at any other river location.

6.5.4 Grain Size

Greater than 50 percent of the sediment sample composition was comprised of sand for the river samples, ranging from 51.4 to 70.6 percent. Only the reference location contained gravel at 2.8 percent. No other location contained gravel. The next highest composition was silt ranging from 7.8 percent to 34.9 percent (Table 16).

6.5.5 Total Organic Carbon

The sediment samples collected from the river were analyzed for total organic carbon. The percent organic carbon in the river samples was very low, approximately 1 percent at Locations BMI-3 and BMI-6. This indicates that the composition of the sediment was mostly mineral at this location. The highest organic carbon was found at Reference Area No. 2 at 12.2 percent. All other river locations were below 4.5 percent organic carbon (Table 16).

6.6 Results of the Analysis of Surface Soil

6.6.1 Metals

Soil samples were collected at the same locations as the small mammal trap lines, as well as from the area identified as the PCB Spill Area and a location near the Emergency Pond (Table 17). The Treatment Plant sample had the highest Zn concentration at 710 mg/kg. The Fly Ash Pile contained elevated As, Ba, Cu, Cr, Hg, Ni, and Se compared to the other samples.

There were no other clear trends in the metals results. This is not unexpected because the selection of the soil sampling locations was based on the proximity to different contaminant sources throughout the site.

6.6.2 VOCs

Acetone (190 ug/kg) and chloroform (19 ug/kg) were detected in the soil samples collected from the Fly Ash Pile. It should be noted that the positive results for VOCs in the Fly Ash Pile are estimated due to the internal standard exceeding the QC criteria. Methylene chloride was detected in estimated amounts from the PCB Spill Area (an estimated 4 ug/kg) and the Treatment Plant Area (an estimated 3 ug/kg). No other VOCs were detected in the soil samples collected on the site (Table 18).

6.6.3 PCB/Pesticides

Pesticides were not detected in any soil samples. Aroclor 1248 and Aroclor 1254 were detected in the soil sample collected from the PCB Spill Area at concentrations of 84 ug/kg and 340 ug/kg, respectively. PCBs were not detected at any other location (Table 19).

6.6.4 BNAs

Chrysene was detected in the soil sample collected from the PCB Spill Area at a concentration of 1,200 ug/kg. This concentration was estimated below the detection limit. BNAs were not detected in any other on-site soil sample (Table 20).

6.6.5 Grain Size

Except for the areas near the Emergency Pond, the on-site soil samples contained less than 13.6 percent gravel (Fly Ash Pile). The soil samples were composed mostly of sand, ranging from 34.6 percent at the Fly Ash Pile to 87.2 percent adjacent to the Emergency Pond. Clay made up for less than 10 percent of the composition and colloids made up less than 25.7 percent (Table 21).

6.6.6 Total Organic Carbon

The soil samples collected for the toxicity tests were analyzed for TOC. The results are variable with the fly ash pile having the greatest TOC at 29.4 percent and the next highest found in the Emergency Pond at 17.1 percent. The lowest of the on-site soil samples was 3.8 in the wetland area of the site. All other locations had less than 8.1 percent organic carbon (Table 21).

6.7 Description of the Aqueous Phase Surface Water Toxicity Evaluation

6.7.1 *Pimephales promelas*

Chronic (7-day) aqueous phase toxicity tests were conducted on surface water samples from Sulfate Basin No. 1, the Emergency Pond, the Polishing Pond, Sulfate Basin No. 5 and Fly Ash Basin No. 6. After seven days of exposure, the survival of *P. promelas* ranged from 49 percent (Polishing Pond at a 50 percent dilution) to 100 percent in Sulfate Basin No. 1. Both the 50 percent dilution and the 100 percent samples from the Polishing Pond displayed significantly reduced survival ($p=0.05$). Survival was also significantly reduced ($p=0.05$) in Fly Ash Basin No. 6 (Table 22).

To determine if the concentration of metals in the water impacted survival, a correlation analysis was conducted. There was no correlation between Zn and survival. The concentrations of As, Cd, Cr, Cu, Ni, volatile organic compounds, and Pest/PCBs were below the method detection limit and no comparison was made. In addition, a correlation was conducted using pH, conductivity, dissolved oxygen, and hardness. Again, there was no correlation with survival.

In addition, the ambient water quality criteria for Zn (U.S. EPA 1992) was calculated, based on the hardness of the water, for the on-site basins. The acute criteria ranged from 137 - 237 ug/L total Zn, and the chronic criteria ranged from 124 - 215 ug/L total Zn. It should be noted that the concentration of Zn in the Emergency Pond and the Polishing Pond exceeded the acute and chronic criteria. This may explain the mortality in the Polishing Pond. However, the concentration of Zn in the Emergency Pond (1,700 ug/L) did not cause any mortality in the fathead minnow. The concentration of Zn in Fly Ash Basin No. 6 was approximately 2.5 ug/L and this water sample had significant mortality, even though the concentration of Zn was far below the criteria.

The concentration of Zn in the water column was also compared to the literature. Kock

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and Bucher (1997) indicated an LC_{50} of Zn to rainbow trout of 1,900 to 2,300 ug/L (at a hardness of 140-180). The Emergency Pond had the highest concentration of zinc at 1,700 ug/L (hardness of 229). This water sample did not cause a significant reduction in survival of *Pimephales promelas*.

Growth of *Pimephales promelas* was measured as mean dry weight. The mean dry weight of the surviving individuals ranged from 0.43 mg per organism (Polishing Pond) to 0.53 mg per organism (Emergency Pond). No significant differences were noted in the growth of the fish during the exposure period. The complete results of the toxicity tests are included in Appendix F.

6.7.2 *Ceriodaphnia dubia*

Chronic (7-day) aqueous phase toxicity tests were conducted on surface water samples from Sulfate Basin No. 1, the Emergency Pond, the Polishing Pond, Sulfate Basin No. 5 and Fly Ash Basin No. 6. Survival of *Ceriodaphnia dubia* ranged from 90 percent to 100 percent in the samples. There were no significant differences (p=0.05) in survival between any treatment and the control. Mean neonate production in the surviving females ranged from 15.7 young to 27.7 young per female. There were no significant differences (p=0.05) in neonate production between the control and the site water samples (Table 23).

The results of these toxicity tests were compared with those in the literature. Zou (1997) found a No Observed Effect Concentration (NOEC) of 25 ug/L and a median effect concentration (EC_{50}) of 249.8 ug/L $ZnCl_2$ for the inhibition of the brood size for a cladoceran. A comparison of these concentrations to those found in the on-site basins indicate that the NOEC was exceeded in all basins except Fly Ash Basin No. 6 and the EC_{50} was exceeded in the Emergency Pond. Zou (1997) determined the NOEC and the EC_{50} based on the number of progeny after four, five, and six broods. A standard 7-day chronic cladoceran test is terminated following three broods (as were the tests in this study). Therefore, although survival of the adults and the total number of progeny was not impacted, there could be potential effects after a longer exposure duration.

6.8 Description of the Solid-Phase Sediment Toxicity Evaluation

6.8.1 *Hyallela azteca*

Ten-day whole sediment toxicity tests were conducted on surface sediment samples from the South Fork of the Shenandoah River. Tests were conducted on sediment samples collected from Reference No. 2, BMI-1, BMI-2, BMI-3, BMI-4, and BMI-5. Survival in the Reference No. 2 sediment was not significantly different (p=0.05) from that of the control following the 10-day exposure period. There were no significant differences in the survival between any of the locations and the reference. At the completion of the exposure, the organisms were weighed and measured. There were no significant differences in the length or the weight between any of the locations and the reference (Table 24).

Sediment samples were also collected from Sulfate Basin No. 1, Fly Ash Basin No. 6, Sulfate Basin No. 5, Emergency Pond, Polishing Pond, and Viscose Creek. Survival was significantly reduced (p=0.05) in sediment samples collected from Sulfate Basin No. 5, the Emergency Pond, and the Viscose Creek.

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To determine if the metal levels in the on-site basins were impacting survival, a correlation analysis was conducted to compare percent survival and metal levels. This analysis indicated that increasing Zn concentrations were negatively correlated with percent survival in amphipods ($p=0.10$). A correlation was also conducted with As, Cd, Cr, Cu, Pb, and Ni, and the results indicated that there was no correlation between survival and these metals.

Growth was measured as length and weight. Growth in the Sulfate Basin No. 5, could not be determined due to 100 percent mortality (Table 25). A correlation analysis was conducted to compare growth (both length and weight) and metal levels. This analysis indicated that increasing Zn concentrations were negatively correlated (excluding Sulfate Basin No. 5) with the weight of the amphipods ($p=0.10$). There was no correlation between the length of the amphipod and zinc concentrations. A correlation was also conducted with As, Cd, Cr, Cu, Pb, and Ni, and the results indicated that there was no correlation between growth and these metals.

6.8.2 *Chironomus tentans*

Ten-day whole sediment toxicity tests were conducted on surface sediment samples collected from the South Fork of the Shenandoah River. Samples were collected from Reference No. 2, BMI-1, BMI-2, BMI-3, BMI-4, and BMI-5. There were no significant differences between the control and Reference No. 2. Survival was significantly reduced ($p=0.05$) in the sediments collected from the BMI-5 (59 percent survival).

Growth was measured as dry weight in the organisms surviving at the completion of the tests. There were no significant differences in the growth as compared to the control (Table 24).

Sediment samples were also collected from several basins on the site. Samples were collected from Sulfate Basin No. 1, Fly Ash Basin No. 6, Sulfate Basin No. 5, Emergency Pond, Polishing Pond, and Viscose Creek. Survival was significantly reduced ($p=0.05$) in the sediments collected from Sulfate Basin No. 5, Fly Ash Basin No. 6, the Emergency Pond, and the Polishing Pond. To determine if the metal levels in the on-site basins were impacting survival, a correlation analysis was conducted to compare percent survival and metal levels. This analysis indicated that increasing Zn concentrations did not correlate with percent survival in chironomids ($p=0.10$). A correlation was also conducted with As, Cd, Cr, Cu, Pb, and Ni, and the results indicated that there was no correlation with these other metals.

Growth was measured as dry weight in *C. tentans*. Growth of the control and the reference samples were within the acceptable limits of the assay; however, the sediment from Reference No. 2 resulted in growth which was significantly greater ($p=0.05$) than the growth observed in the control, Sulfate Basin No. 5, Fly Ash Basin No. 6, and Emergency Pond (Table 25). A correlation was also conducted which compared growth and the concentration of zinc in the sediment. There was no correlation between Zn concentration and growth of chironomids ($p=0.10$). A correlation was also conducted with As, Cd, Cr, Cu, Pb, and Ni, and the results indicated that there was no correlation with these other metals.

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6.9 Description of the Solid-Phase Soil Earthworm Toxicity Evaluation

6.9.1 Results of Earthworm 14-day Toxicity Evaluation

Soil toxicity tests were conducted on surface soil samples from the Reference, Wetland Area, Emergency Pond, PCB Spill Area, Wastewater Treatment Plant and Fly Ash Pile. Survival at the 14-day endpoint met or exceeded 99 percent in all treatments. None of the treatments exhibited statistical significance differences from the control or reference (Table 26).

6.9.2 Results of the Earthworm 28-day Toxicity Evaluation

Soil toxicity tests were conducted on surface soil samples the Reference, Wetland Area, Emergency Pond, PCB Spill Area, Wastewater Treatment Plant and Fly Ash Pile. Some mortality was observed in the samples from the Reference Area and the Fly Ash Pile after the 28-day exposure period. Survival at the 28-day endpoint met or exceeded 81 percent in all treatments. None of the treatments exhibited statistical significance differences from the control or Reference (Table 26).

Growth was measured as wet weight and converted to percent based on the initial weights. The average percentage growth of the worms ranged from -20 percent (Fly Ash Pile) to 43.2 percent (Wastewater Treatment Plant). The average laboratory control and field reference percentage growths were 40.4 and 2.4 percent, respectively. The average percentage growth was reduced in two samples, the Fly Ash Pile and the PCB Spill Area (Table 26).

A correlation analysis was conducted to determine if the growth in earthworms was related to metals in soil and tissue, PCBs in soil and tissue, and other physical parameters such as grain size and TOC. The growth in the earthworms was not correlated with any of these factors. However, the soil sample collected from the PCB Spill Area was composed of a very dense clay material and the soil sample collected from the Fly Ash Pile was composed of a very fine ash material. Therefore, these physical differences in the soil type (compared to the more organic loam collected from the other areas) may be the reason for the reduced growth in the worms.

6.9.3 Metals in Earthworm Tissue

With the exception of Sb, Be, Cd, Ni, Hg, Ag, V and Tl, all remaining TAL metals were detected in earthworm tissue. The maximum concentrations of these metals were as follows: Al (1,600 mg/kg), As (26 mg/kg), Ba (79 mg/kg), Ca (5,700 mg/kg), Cr (6.5 mg/kg), Co (11 mg/kg), Cu (32 mg/kg), Fe (2,500 mg/kg), Pb (3.3 mg/kg), Mg (1,600 mg/kg), Mn (140 mg/kg), K (9,700 mg/kg), Se (8.4 mg/kg), Na (6,500 mg/kg), and Zn (180 mg/kg) (Table 27). The mean and maximum concentrations were calculated (in both wet and dry weight) for each metal used in the food chain models (Table 28).

A review of the literature indicates that the concentration of metals in earthworm tissue is dependent on the soil concentration, the intrinsic rate of bioaccumulation, and the tolerance of the organism to that element. It also depends on the influence of soil factors (e.g., pH or total organic carbon) determining the availability of the metal for uptake. (Ma 1982). Hartenstein et al. (1980) found that in soils containing 68 - 210 mg/kg Zn, the upper concentration of Zn in earthworms was 250 mg/kg. VanGestel et al. (1993) found that 560 mg/kg Zn in the soil significantly reduced the number of cocoons and the

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number of juveniles produced by earthworms. The soil sample collected from the Treatment Plant Area (710 mg/kg) was higher than this level. Therefore, while survival may not be impacted by the concentration of metals in the on-site soils, the reproductive ability of the worms may be impacted.

6.9.4 PCBs in Earthworm Tissue

Following the completion of the 28-day earthworm toxicity test, the animals were allowed to clear overnight. The animals were then frozen and shipped to REAC. The worms were analyzed for PCBs. Based on the mass of sample submitted, there was sufficient volume for the analysis of each replicate sample. It should be noted that the holding time for the extraction of the earthworms was exceeded by two days for sample Lab Control 1A and 11-215-505A and by one day for all remaining earthworm samples. The QC protocol requires that all PCB results be qualified as estimated.

The results indicate that low levels of Aroclor 1248 were found in every sample, including the control samples [six replicates (Table 29)]. The concentration of Aroclor 1248 in the worms exposed to the control soil range from 61 to 350 ug/kg. The concentration of Aroclor 1248 in the worms exposed to site soil range from 61 to 540 ug/kg. The highest concentration of Aroclor 1248 was detected in the worms exposed to soil from the PCB Area (500 to 540 ug/kg). Therefore, it appears that the presence of this Aroclor is site related, however, the concentrations are confounded by the presence of Aroclor 1248 in all of the worms. Worms were not analyzed at the beginning of the tests, so it is difficult to determine the source of Aroclor 1248 in the control worms.

Aroclors 1254 and 1260 were not detected in the Control, Reference, Wetland Area, or Fly Ash Pile. These Aroclors were detected in the Emergency Pond, PCB Spill Area, and Treatment Plant. The concentration of Aroclor 1254 ranged from 46 to 81 ug/kg (estimated below the detection limit) from the Emergency Pond samples; from 2,200 to 2,800 ug/kg from the PCB Spill Area; and from 37 to 47 ug/kg (estimated below the detection limit) at the Treatment Plant.

The concentration of Aroclor 1260 ranged from 64 to 104 ug/kg (estimated below the detection limit) from the Emergency Pond samples; from 54 to 81 ug/kg from the PCB Spill Area; and from 53 to 64 ug/kg (estimated below the detection limit) in the Treatment Plant. The mean and maximum concentrations were calculated (in both wet and dry weight) for PCBs used in the food chain models (Table 28).

A review of the literature indicates that presence of PCBs in tissue may suppress secretory rosette formation. Fitzpatrick et al. (1992) found that a tissue concentration of 1,900 mg/kg dry weight reduced the ability of *E. foetida* coelomic leukocytes to form secretory rosettes. In another study, Rodriguez et al. (1989) found that a tissue concentration of 76.5 mg/kg dry weight also suppresses secretory rosette formation. The reduction of secretory rosettes implies an immunosuppression function in worms. The concentration of PCBs accumulated in earthworms exposed to soil collected on site are far below these concentrations.

It is interesting to note that PCBs were detected only in the soil sample collected from the PCB Spill Area, yet earthworms exposed to the soil from the Treatment Plant Area and the Emergency Pond Area also contained measurable levels of PCBs. Diercxsens et al. (1985) explained that earthworms concentrate PCBs in much higher levels than those found in the soil by selectively feeding on the soil fraction with a high organic matter

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content. This may explain why PCBs were detected in the tissue but not in the soil.

6.10 Results of the Fingernail Clam Analysis

Fingernail clams were collected at each of the locations in the South Fork of the Shenandoah River that the benthic macroinvertebrates and toxicity test sediment were collected (Reference No. 2, BMI-1, BMI-2, BMI-3, BMI-4, and BMI-5). Clams were pooled to provide sufficient mass for analysis. This provided enough mass for at least two analyses from each location except for BMI-4, in which there was only sufficient mass for one analyses.

Clams were analyzed for TAL metals, Pest/PCBs, percent moisture, and percent lipids. Several pesticides were detected in the clam tissue (Table 30). Aldrin, g-chlordane, dieldrin, and methoxychlor were detected in low levels in several of the clam samples. Heptachlor epoxide was detected in at least one replicate clam sample collected at each location (at estimated levels below the detection limits). The compound 2,2-bis(4-chlorophenyl)-1,1-dicloroethylene (p,p'-DDE) was detected at a low level at the reference location, and it was detected at a concentration of 63 ug/kg at a clam sample collected from BMI-4. Endrin was detected in one clam sample collected from BMI-3 at a concentration of 47 ug/kg.

Polychlorinated biphenyls were detected in every clam sample. Aroclor 1254 was detected at concentrations that ranged from 62 to 2,300 ug/kg, dry weight. The highest concentration was detected at BMI-4, and the lowest concentration was detected at BMI-5. Aroclor 1260 was also detected in several of the clam samples at a range of 64 ug/kg to 510 ug/kg. The only concentration of Aroclor 1260 above the detection limit was 510 ug/kg in clam sample BMI-4. The clam samples from the Reference location and BMI-1 did not contain Aroclor 1260 above the detection limit. The mean concentration and maximum concentration were calculated (in both wet and dry weight) for PCBs used in the food chain models (Table 31).

The clams were also analyzed for TAL metals (Table 32). Antimony, Be, Cd, Co, Ni, Ag, Tl, and V were not detected in any clam sample. Of the contaminants of concern, mercury was detected in all samples above the detection limits, with 1.0 mg/kg detected in an upstream reference sample. Arsenic ranged from 1.8 mg/kg at BMI-3 to 3.6 at BMI-1, and Cr ranged from non detected at BMI-1, BMI-2, and BMI-3 to 4.7 at BMI-5. Copper ranged from 16 mg/kg at BMI-3 to 44 mg/kg at the Reference location and Zn ranged from 70 mg/kg at BMI-3 to 190 mg/kg at the Reference location. In reviewing the data, the bioaccumulation factor (BAF) for Zn from sediment to clams ranged from 0.8 at BMI-3 and BMI-5 to 3 at BMI-4. However, the BAF for Zn is fairly uniform between locations with the mean being 1.7 (± 0.7). The mean concentration and maximum concentration were calculated (in both wet and dry weight) for metals used in the food chain models (Table 31).

Doherty (1990) reviewed the literature on the use of the Asiatic clam as a biological indicator. The studies indicate that they do accumulate organic pollutants and metals from both the water and the sediment. In another study, Elder and Mattraw (1984) measured pesticides and PCBs in clam tissues, sediment and bottom-load detritus and this study indicated an increasing trend in the accumulation of PCBs from sediment to detritus to clams. It also indicated that chlordane levels were 10 times higher in detritus and 50 times higher in the clam tissue than in the sediment (even at levels not detected in the sediment). This same pattern was noted in the samples collected from the Avtex Fibers Site. However, literature was not available on the effects of PCB tissue concentrations on the clam.

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6.11 Results of the Fish Tissue Analysis

6.11.1 Redbreast Sunfish

The fish were analyzed for metals, Pest/PCBs, percent lipids, and percent moisture. Several pesticides were detected in the fish tissue. Several of the BHC congeners, heptachlor, heptachlor epoxide, chlordane, dieldrin, and endrin were detected in the fish tissue. The compound p,p'-DDE was detected in every fish tissue sample above the detection limits. The concentration of DDE ranges from 17 ug/kg at Outfall 001 to 42 ug/kg at the Downstream Location. The concentration of DDE increases from Outfall 002 to Outfall 004 to the Downstream Location (Table 33).

Polychlorinated biphenyls were detected in every sunfish sample, including the Reference. Aroclor 1254 was detected at an average concentration of 86 ug/kg at Outfall 001 to 551 ug/kg at Outfall 004. Aroclor 1254 was not detected in fish collected from the Downstream Location. However, this may be due to the large concentration of Aroclor 1260 detected at this location, which may have masked the concentration of Aroclor 1254. Aroclor 1260 was detected in all sunfish tissue samples. The concentration ranged from an average of 152 ug/kg at Outfall 001 to 9488 ug/kg at the Downstream Location. The concentration of Aroclor 1260 increases in a downstream direction. All fish contained greater than 1 mg/kg total PCBs at the Downstream Location (on a dry weight basis) (Table 33). The mean concentration and maximum concentration were calculated (in both wet and dry weight) for PCBs used in the food chain models (Table 34).

To determine the significance of these levels, studies reported in the literature were reviewed. U.S. EPA (1980) indicated that a whole body concentration of Aroclor 1242 of 0.4 mg/kg, wet weight produced eggs with low survival and numerous fry deformities in rainbow trout. In another study, Mayer et al. (1997) found that a whole body concentration of 4.8 mg/kg (assumed to be on a wet weight basis) Aroclor 1254 caused significant increases in thyroid activity after an exposure of 193 days. This may be important because thyroid function is associated with most major biochemical functions in fish. Two of the redbreast sunfish collected from the Downstream Location contained PCBs at levels of 4.5 mg/kg, wet weight. Recognizing that different Aroclors have different toxicities, the concentration of PCBs in redbreast sunfish comes close to or exceeds concentration shown to have effects in laboratory studies. A review of the literature by Niimi (1996) summarizes that in laboratory studies >50 - 100 mg/kg in fish tissue may be required to adversely affect growth and reproduction.

Arsenic, Cd, Pb, and Ni were not detected in any redbreast sunfish (Table 35). Chromium was detected in several fish collected from the reference area (in six fish ranging in concentration from 1.4 to 2.5 mg/kg), Outfall 001 (in four fish ranging from 1.5 to 2.1 mg/kg), Outfall 002 (in three fish ranging from 1.5 to 2.7 mg/kg), Outfall 004 (in four fish ranging in concentration from 1.5 to 2.3 mg/kg, and Downstream (in five fish ranging in concentration from 1.2 to 1.5 mg/kg). Copper was detected in several fish collected from the Reference Area (in seven fish ranging in concentration from 1.5 to 2.9 mg/kg), Outfall 001 (in four fish ranging from 1.5 to 10.0 mg/kg), Outfall 002 (in eight fish ranging from 1.6 to 4.1 mg/kg), Outfall 004 (in eight fish ranging in concentration from 1.9 to 5.4 mg/kg, and Downstream (in eight fish ranging in concentration from 1.5 to 5.8 mg/kg). Mercury was also detected in every redbreast sunfish at concentrations ranging from 0.69 to 0.81 mg/kg.

Zinc was detected in every sunfish. The mean concentration of Zn increases moving in a downstream direction. The mean concentration of Zn in the fish collected from the reference area is 67 mg/kg (± 9 mg/kg), which increases to a mean concentration of Zn in the Downstream Location of 80 mg/kg (±14 mg/kg). However, because of the overlap in the standard deviation of these concentrations, this increase may not be significant. The mean and maximum concentration were calculated (in both wet and dry weight) for metals used in the food chain models (Table 34).

6.11.2 Carp

Seven carp were collected from Sulfate Basin No. 5 and the fish were analyzed for whole body metals, pesticide/PCBs, moisture, and lipids. Several pesticides were detected in the carp tissue at estimated values. The compounds b-BHC, aldrin, a-chlordane, and endrin ketone were detected in several fish. The compound p,p'-DDE was detected in every carp at levels below the detection limit. The concentrations ranged from 4.5 ug/kg to 13 ug/kg, dry weight. The only pesticide detected above the detection limit was endrin in one fish at a concentration of 26 ug/kg, dry weight (Table 36).

Polychlorinated biphenyls were detected in every carp collected from Sulfate Basin No. 5. Aroclor 1254 ranged from 110 ug/kg to 290 ug/kg, dry weight. Aroclor 1260 ranged from 100 to 210 ug/kg, dry weight. The peak pattern on the spectrograph indicated that although the compounds were detected above the detection limit, the compounds were weathered (Table 36). The mean concentration and maximum concentration were calculated (in both wet and dry weight) for PCBs used in the food chain models (Table 37).

Carp collected from Sulfate Basin No. 5 were also analyzed for TAL metals (Table 38). Of the metals of concern previously identified, As, Cd, and Ni were not detected in fish tissue. Lead was detected in one fish at a concentration of 2.3 mg/kg. Chromium was detected in six of the seven fish collected at concentrations ranging from 2 mg/kg to 3.2 mg/kg. Zinc was detected in every fish at concentrations ranging from 280 mg/kg to 1300 mg/kg. Mercury was detected in two carp above the detection limit at concentrations of 0.16 and 0.19 mg/kg. The mean concentration and maximum concentration were calculated (in both wet and dry weight) for metals used in the food chain models (Table 37).

6.12 Results of the Small Mammal Trapping

A variety of small mammals were collected from each of the four trapping areas. Seventeen small mammals were collected from the Reference Area; 10 of which were *Blarina brevicauda* (shorttail shrew) and seven which were *Microtus pennsylvanicus* (meadow vole). Seven animals were captured near the Wastewater Treatment Plant; five of which were meadow vole, one was a *Peromyscus leucopus* (deer mouse), and one was an unidentified juvenile. Ten animals were collected from the Fly Ash Pile and they were all meadow vole. Only four animals were collected at the Wetland Trapping Area; one of which was a shorttail shrew and the others were deer mice.

6.12.1 Metals

The concentrations of metals in the small mammals were compared for each location and between each species (Table 39). Based on the results, there are no clear differences between either the species or the area. For example, the concentration of Zn ranged from 92 to 130 mg/kg in the Wetland Area, from 85 to 110 mg/kg in the Treatment Plant Area,

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from 67 to 120 mg/kg in the Fly Ash Pile, and from 76 to 240 mg/kg in the Reference Area.

To make comparisons of the data, the data was converted to wet weight by multiplying by the percent solids. In addition, a mean concentration was determined for the metals from each of the trapping areas. Arsenic ranged from 0.12 mg/kg at the Wetland Area to 0.18 mg/kg at the Fly Ash Pile. Cadmium ranged from 0.11 at the Treatment Plant Area to 0.17 mg/kg at the Wetland Area. Chromium ranged from 0.48 mg/kg at the Wetland Area to 0.68 mg/kg at the Fly Ash Pile. Copper ranged from 2.15 mg/kg at the Treatment Plant Area to 3.2 mg/kg at the Wetland Area. Nickel ranged from 0.38 mg/kg at the Reference Area to 0.40 mg/kg at the Wetland Area. Zinc ranged from 26.5 mg/kg at the Fly Ash Pile to 34.2 mg/kg at the Reference Area. Mercury was not detected in small mammals collected from the Treatment Plant or Fly Ash Areas. Two animals had Hg concentrations above the detection limit at the Wetland Area (0.24 and 0.08 mg/kg) and six animals had Hg concentrations above the detection limit from the Reference Area (0.21 to 0.49 mg/kg). The mean concentration and maximum concentration were calculated (in both wet and dry weight) for metals used in the food chain models (Table 40).

It appears that several of the contaminants are highest in the Wetland Area. However, this may be due to a small sample size compared to the number of animals collected from the other trapping areas.

A review of the literature indicates that the accumulation of metals in mammals is variable. Johnson et al. (1977) found that the total tissue concentration of Zn was not significantly different in mammals trapped in an area containing an average of 131 mg/kg compared to a concentration of 21,000 mg/kg Zn. In another study, Talmage and Watson (1991) found that the tissue Zn concentration in nine species of small mammals collected from reference areas ranged from 96 - 201 mg/kg, dry weight. These levels are in fact higher than those levels found on the site. Also, Ma (1987) found that the accumulated levels of Zn, and Cd and Pb, do not consistently reflect the metals concentration found in the soil, and that the concentration is based on the bioavailability of these metals and the factors that affect availability.

6.12.2 Pesticides/PCBs

Small mammals were also analyzed for Pest/PCBs (Table 41). Low levels of endrin ketone, heptachlor epoxide, p,p'-DDE, dieldrin, endrin, and p,p'-DDT were detected in several of the small mammals collected from the Reference Area. In most instances, the concentrations were estimated below the detection limit. No pesticides were detected in the animals captured from the Treatment Plant Area. Endrin ketone was detected in one animal collected from the Wetland Area at 22 ug/kg dry weight, and endrin ketone and p,p'-DDT were each detected in one animal collected from the Fly Ash Pile. Based on these results, it appears that pesticides are not accumulating in animal tissue. A larger number of pesticides were detected in the animals collected from the Reference Area. This may be due to the larger number of animals captured from this area (17) compared to the other areas (10 from the Fly Ash Pile, 4 from the Wetland Area, and 7 from the Treatment Plant Area).

Small mammals were also analyzed for PCBs. Aroclors 1254 and 1260 were detected in many of the animals. Aroclor 1254 was detected in one animal collected from the Reference Area (0.095 mg/kg), and Aroclor 1260 was detected in nine of the seventeen

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animals collected from the Reference Area at concentrations ranging from 0.018 mg/kg to 0.22 mg/kg, dry weight.

Aroclor 1260 was detected in all animals collected from the Treatment Plant at concentrations ranging from 0.25 to 0.74 mg/kg, dry weight. Only four of the 10 animals collected from the Fly Ash Pile contained Aroclor 1260 at concentrations ranging from 0.04 to 0.910 mg/kg, dry weight. Two out of the four animals collected from the Wetland Area contained Aroclor 1254 (0.46 and 0.18 mg/kg, dry weight) and all four animals contained Aroclor 1260. The concentrations were extremely variable, ranging from 0.028 to 6.3 mg/kg, dry weight. The highest concentration was in a deer mouse (6.3 mg/kg, dry weight). Due to the small sample size, it is difficult to determine if these concentrations accurately represent the contaminant levels in small mammals inhabiting the Wetland Area.

Although it is difficult to make comparisons due to the small sample size, Batty et al. (1990) found that a whole body concentration of PCBs at 0.42 - 4.17 (mean of 2.3 mg/kg) caused an inhibition of reproduction and changes in the liver, spleen, adrenal and testis function. The level of Aroclor 1260 in a deer mouse collected on site was 2.5 mg/kg wet weight (6.3 mg/kg, dry weight). The other animals contained much lower tissue concentrations. The mean concentration and maximum concentration were calculated (in both wet and dry weight) for PCBs used in the food chain models (Table 40).

6.12.3 Histopathology

Sections of the liver and kidney were evaluated for histopathological anomalies (Appendix G). Based on the results of the pathology report, specific toxic, neoplastic, or primary degenerative changes were not identified in the liver or kidney tissues. Specifically, long-term lesions appeared in animal 237 (deer mouse collected from the Treatment Plant Area) which indicated an infection that appears to be ascending up the biliary tree. There was an active infectious and inflammatory process in animal 233 (meadow vole collected from the Treatment Plant Area).

Other animals demonstrated focal areas of inflammation and a suggestion of parasitic migration. In addition, animal 214 (shorttail shrew collected from the Reference Area) had amyloidosis in the liver and renal glomeruli. This suggests a bacterial infection or chronic inflammation in other sites, resulting in some type of atypical antigen/antibody response in this individual.

Overall, the report indicates that the tissues were well preserved and that many of the animals were immature (Appendix G).

6.13 Results of the Benthic Macroinvertebrate Survey

The organisms in each sample were removed from the substrate, identified to lowest practical taxon and enumerated (Table 42). Total numbers of organisms collected ranged from 236 to 1243. The total number of distinct taxa identified (taxa richness) ranged from 15 to 29, with the lowest richness found at BMI-3 and the highest at BMI-1. Standardized community metrics were calculated for each sample (Table 43).

The total number of organisms present and the number of distinct taxa identified are presented. The functional group of each taxa was determined by using the tables in Merritt and Cummins

(1996). The number of scrapers and filterers were determined and used to evaluate the scraper:filterer ratio. Species diversity in each sample was evaluated using Shannon's H'. The number of organisms in the orders Plecoptera, Ephemeroptera, and Trichoptera were determined and compared to the numbers of organisms in the family Chironomidae to evaluate the Ephemeroptera/Plecoptera/Trichoptera:Chironomid (EPT:C) ratio. The percent contribution of the dominant taxon was calculated by dividing the number of organisms in the most abundant taxon by the total number of organisms collected. All calculations were performed using Microsoft Excel. Hilsenhoff's biotic index was conducted using the modifications suggested by the U.S. EPA's Rapid Bioassessment Protocol (U.S. EPA 1989).

To determine the biological condition at each station, the metrics were averaged across the three replicates (or recalculated, depending on the metric) and the result tabulated for each of the six stations and the reference. The condition score at each station was then compared to the score at the reference and evaluated using the criteria in U.S. EPA (1989).

The metrics were then averaged across replicates or recalculated as appropriate to determine the community metrics for each of the stations (Table 44). There are no obvious upstream/downstream trends in the data. Stations 1,2,4,5 and 6 were considered not impaired compared to the reference. Station 3 can be considered slightly impaired compared to the reference. This appears to be due to a reduction in Biotic Index, a decreased EPT:chironomid ratio, and a reduced EPT index. The H'diversity was also lower at BMI-3 than any of the other stations. Because the condition index was only slightly depressed relative to the reference, care should be exercised to consult additional available data on water and sediment quality, stream flow and depth, and habitat quality before further interpretations are made regarding these data. A complete report on the benthic macroinvertebrates collected from the river is included in Appendix H.

7.0 RISK CHARACTERIZATION

The following method was used to calculate risk. To estimate the risk to wildlife in the model systems utilizing the Avtex Fibers site, implications of the exposure concentrations need to be determined. The HQ method (U.S. EPA 1989, Barnthouse et al. 1986) compares exposure concentrations to ecological endpoints such as reproductive failure or reduced growth. The comparisons are expressed as ratios of potential intake values to population effect levels, or:

$$\text{Hazard Quotient (HQ)} = \frac{\text{Mean Exposure Concentration}}{\text{No Observed Adverse Effect Level (NOAEL)}}$$

A HQ greater than one indicates that exposure to the contaminant has the potential to cause adverse effects in the organism. A HQ less than one does not indicate a lack of risk. The HQ should be interpreted based on the severity of the effect reported. The results of the risk characterization are presented next. For informational purposes, hazard quotients were also calculated using LOAEL values and also using the maximum concentration of a contaminant from an area. A summary of the LOAELs/NOAELs used for each receptor species are listed in Table 45 and a summary of the life history parameters are listed in Table 46.

7.1 **Assessment Endpoint No. 1** - Protection of benthic invertebrate communities to maintain species diversity and nutrient cycling (trophic structure), to provide a food source for higher level consumers, and to insure that contaminant levels in benthic invertebrate tissues are low enough to minimize the risk of bioaccumulation and/or other negative toxic effects in higher trophic levels.

A benthic macroinvertebrate survey was conducted in the South Fork of the Shenandoah River.

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Samples were collected from an upstream reference, five locations adjacent to the site, and one downstream location. There were no obvious upstream/downstream trends in the data. The station identified as BMI-3 was slightly impaired (based on the Biotic Index, a decreased EPT:chironomid ratio, and a reduced EPT index) when compared to the reference. This location was adjacent to Sulfate Basins No. 1 and No. 2.

Sediment samples were collected from the same locations and evaluated using *Hyallela azteca* and *Chironomus tentans* toxicity tests. The results of these tests indicate that there is no significant decrease in survival or growth when compared to the control.

Fingernail clams were also collected from the same locations (except BMI-6). The results of the analyses of soft tissue indicate that clams are bioaccumulating metals and PCBs. The highest concentration of Aroclor 1254 was in clams collected adjacent to Outfall 004 (Treatment Plant Outfall).

Sediment samples were also collected from six on-site locations to determine potential impacts to the invertebrate community. The results of toxicity tests indicate reduced survival of *Chironomus tentans* exposed to sediment collected from Sulfate Basin No. 5, Fly Ash Basin No. 6, Emergency Pond, and the Polishing Pond. Growth was also slightly reduced in Sulfate Basin No. 5, Fly Ash Basin No. 6, and the Emergency Pond. These responses were slightly correlated with Zn levels. The same sediments were tested using *Hyallela azteca,* and a decrease in survival was noted in Sulfate Basin No.5 (100 percent mortality), Emergency Pond, and the Viscose Creek. There was no significant reduction in growth. Again these responses were slightly correlated with Zn.

To determine the impacts of the exposure to surface water in the basins, water samples were tested using *Ceriodaphnia dubia.* These tests showed no significant reduction in survival or reproductive success.

7.2 **Assessment Endpoint No. 2** - Protection of fish communities to insure that ingestion of contaminants by forage fish does not have a negative impact on growth, survival, and reproductive success. Additionally, to insure that contaminant levels accumulated in fish tissues are low enough to minimize the risk of accumulation and negative effect in higher trophic levels.

Redbreast sunfish collected from the South Fork of the Shenandoah River contained Aroclor 1260. The tissue concentration increased in a downstream direction, and the concentrations were near those shown to cause toxicity in laboratory studies. The concentration of Zn in tissue also increased in a downstream direction but not significantly.

To determine the effects of contaminants accumulated from on-site sediments, carp were collected from Sulfate Basin No. 5. Aroclors 1254 and 1260 were detected in every carp. In addition, Zn was detected in every carp at levels up to 1,300 mg/kg, dry weight.

Water samples were collected from the basins and analyzed using *Pimephales promelas* toxicity tests. The results indicate that there was reduced survival in the Polishing Pond and Fly Ash Basin No. 6. There was no significant reduction in growth. Also, the concentration on Zn exceeded both the acute and chronic ambient water quality criteria in the Emergency and Polishing Ponds.

7.2.1 Ingestion-Based Model to Smallmouth Bass

Food chain exposure models were used to determine risk to a higher trophic level fish. The concentration of the COPCs in sediment and the mean concentration of the COPCs (both in mg/kg, wet weight) in redbreast sunfish were used in the food chain model to predict risk to the smallmouth bass.

A reiview of the literature indocated that NOAELs and LOAELs were not available for As, Cd, Cu, Pb, Ni, and Zn. Therefore, HQs were not calculated for these metals.

The HQs calculated for Cr exceeded 1 at all river locations when using a mean tissue concentration and a NOAEL in the calculation. It should be noted that the highest HQ was calculated for Reference No. 2. The HQs calculated for Hg were all below 1 using a mean tissue concentration and a NOAEL.

The HQs calculated for PCBs exceeded 1 at river locations BMI-2, BMI-4, and BMI-6. In addition, the HQs increased moving in a downstream direction with the lowest value (0.7) at Reference No. 2 and the highest value at BMI-6 (22.7). The increase in the HQ is directly related to the increasing concentration of PCBs in the redbreast sunfish.

7.3 **Assessment Endpoint No. 3** - Protection of piscivorous birds to insure that ingestion of contaminants in forage fish does not have a negative impact on growth, survival, and reproductive success.

7.3.1 Ingestion-Based Food Model to Belted Kingfisher

Food chain exposure models were used to determine risk to a piscivorous birds. The concentration of the COPCs in sediment and the mean concentration of the COPCs (both in mg/kg, wet weight) in redbreast sunfish and carp were used in the food chain model to predict risk to the belted kingfisher. The risk was calculated based on the exposure to fish captured in the river and those captured from Sulfate Basin No. 5.

A review of the literature indicates that NOAELs were available for all COPCs except Ni. A HQ was not calculated for this metal. The HQs calculated based on exposure to contaminants from the river indicate that As, Cd, Cr, Pb, and Zn do not pose a risk to belted kingfisher. The HQs for Cu and Hg are above 1 for all locations within the river. The HQ calculated based on the expsoure to PCBs in the river increase in a downstream direction. The HQs range from 0.4 at Reference No.2 to 14.8 at the Downstream Location (BMI-6).

The HQs calculated based on the exposure to contaminants from Sulfate Basin No. 5 indicate that As, Cd, Cr, and Pb do not pose a risk to belted kingfisher. The HQs for Cu, Hg, and Zn are above 1 for Sulfate Basin No. 5. The HQ calculated based on the exposure to PCBs in Sulfate Basin No. 5 is below 1.

7.4 **Assessment Endpoint No. 4** - Protection of worm-eating birds to insure that ingestion of contaminants in earthworms does not have a negative impact on growth, survival, and reproductive success. The second part of this assessment endpoint is to insure that the accumulation of contaminants in soil invertebrates (earthworms) does not have a negative impact on growth, survival, and reproductive success of soil invertebrates.

Soil samples were collected from several locations on site. There was no significant reduction in survival at any of the locations tested using a 14-day earthworm toxicity test. However, following a 28-day exposure to site soils, metals and PCBs bioaccumulated.

Although reproductive endpoints were not used in the earthworm test, the concentration of metals

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in the soil at the Treatment Plant location were high enough to cause chronic impacts based on a literature study. In addition, PCBs are accumulating from soil samples collected from the Emergency Pond, the PCB Spill Area, and the Treatment Plant location. However, the levels of PCBs in the tissue are lower than those found to cause effects reported in the literature.

7.4.1 Ingestion-Based Food Model to Woodcock

Food chain exposure models were used to determine risk to worm-eating birds. The concentration of the COPCs in soil and the mean concentration of the COPCs (both in mg/kg, wet weight) in earthworms were used in the food chain model to predict risk to the American woodcock.

The HQs calculated based on the expsoure to Cd and Cr were below 1 for all soil sampling locations. The HQs calculated based on the exposure to As ranged from 1.1 at the Reference and Wetland Areas to 9.9 at the Fly Ash Pile. The HQ calculated for exposure to As in the Emergency Pond soil was below 1. The HQs calculated for Cu and Pb were above 1 at all soil sampling locations. The HQs calculated for Hg ranged from 1.0 at the Reference Area to 2.3 at the Fly Ash Pile. The HQ from the PCB Spill Area was below 1. The HQs calculated for Zn were below 1 at all locations except the PCB Spill Area. The HQ at this location was 1.6.

The HQs calculated based on the exposure to PCBs was below 1 at all locations except the PCB Spill Area. The HQ calculated for this location was 1.5.

7.5 **Assessment Endpoint No. 5** - Protection of carnivorous birds to insure that ingestion of contaminants in prey does not have a negative impact on growth, survival, and reproductive success.

7.5.1 Ingestion-Based Food Model to Red-tailed Hawk

Food chain exposure models were used to determine risk to carnivorous birds. The concentration of the COPCs in soil and the mean concentration of the COPCs (both in mg/kg, wet weight) in small mammals were used in the food chain model to predict risk to the red-tailed hawk.

A review of the literature indicates that NOAELs were available for all COPCs except Ni. A HQ was not calculated for this metal. The HQs calculated for the exposure to As, Cd, and Cr were below 1. The HQs calculated for Cu ranged from 4.1 at the WWTP to 5.7 at the Wetland Area. The HQs for Pb were below 1 at the WWTP and Fly Ash Pile, and they were 2.4 at the Wetland Area and 1.0 at the Reference Area. The same trend was noted for the HQs calculated for Hg. The HQs were below 1 at the WWTP and Fly Ash Pile, and they were 1.4 at the Wetland Area and 2.0 at the Reference. The HQs calculated for Zn were 1 at the Reference, Wetland, and WWTP. The HQ was 0.8 at the Fly Ash pile.

All HQs calculated for PCBs were below 1 at the soil locations.

7.6 **Assessment Endpoint No. 6** - Protection of carnivorous mammals to insure that ingestion of contaminants in prey does not have a negative impact on growth, survival, and reproductive success.

7.6.1 Ingestion Based Food Model to Red Fox

Food chain exposure models were used to determine risk to carnivorous mammals. The concentration of the COPCs in soil and the mean concentration of the COPCs (both in mg/kg, wet weight) in small mammals were used in the food chain model to predict risk to the red fox.

The HQs calculated for the exposure to Cd, Cu, Hg, Ni, and Zn were below 1 at all soil sampling locations. The HQs for As were below 1 for all locations except the Fly Ash Pile. The HQ calculated for exposure to As in the Fly Ash Pile was 1.5. This same trend was noted for Cr. The HQs were below 1 for all locations except the Fly Ash Pile. The HQ calculated for expsosure to Cr in the Fly Ash Pile was 1.0. The HQs calculated for the exposure to Pb were 1.1 at the Reference Area and 2.4 from the Wetland Area. The HQs were below 1 for the WWTP and Fly Ash Piles.

All HQs calculated for PCBs were below 1 at the soil locations.

7.6.2 Ingestion Based Food Model to Mink

Food chain exposure models were used to determine risk to piscivorous mammals. The concentration of the COPCs in sediment and the mean concentration of the COPCs (both in mg/kg, wet weight) in redbreast sunfish were used in the food chain model to predict risk to the mink. The risk was calculated based on the exposure to fish captured in the river.

The HQs calculated based on the exposure to As, Cd, Cr, Cu, Pb, Ni, and Zn were below 1 at all river locations. The HQs calculated for exposure to Hg ranged from 1.5 at Reference No. 2, BMI-4, and BMI-6 to 1.8 at BMI-2.

The HQs calculated based on the exposure to PCBs in the river indicate that the HQs increase in a downstream direction. The HQs calculated for Reference No. 2, BMI-1, and BMI-2 were below 1. The HQ calculated for BMI-4 was 1.1 and the HQ calculated for BMI-6 was 5.4.

7.7 **Assessment Endpoint No. 7** - Protection of omnivorous mammals to insure that ingestion of contaminants in forage does not have a negative impact on growth, survival, and reproductive success, to provide a food source for higher level consumers, and to insure that contaminant levels in omnivore tissues are low enough to minimize the risk of bioaccumulation and/or other negative toxic effects in higher trophic levels.

Small mammals were trapped at four areas of the site. Although metals were detected in the tissue, the concentrations were not higher than those found in the literature for similar species collected from reference areas. Several mammals were accumulating PCBs in the whole body, and although most levels were relatively low, one animal (collected from the Wetland Area) contained a concentration of PCBs that was higher than a level shown to have effects in a laboratory study. There were no contaminant-related histopathological abnormalities in any of the liver or kidney samples analyzed.

7.7.1 Ingestion-Based Food Model to Raccoon

Food chain exposure models were used to determine risk to omnivorous mammals. The concentration of the COPCs in sediment and the mean concentration of the COPCs (both in mg/kg, wet weight) in redbreast sunfish and clams were used in the food chain model to predict risk to raccoon. The risk was calculated based on the exposure to fish and clams collected from the river.

The HQs calculated for exposure to As, Cd, Cu, Ni, and Zn were below 1 at all river locations. The HQs calculated for Cr were above 1 at all river locations and ranged from 1.6 at BMI-1, BMI-2, and BMI-6 to 2.4 at the Reference. The HQs calculated for Pb were below 1 at BMI-4 and BMI-6. The HQs ranged from 1.3 at BMI-2 to 2.1 at the Reference. All HQs calculated for Hg ranged from 4.3 at BMI-4 to 5.7 at the Reference.

The HQs calculated for exposure to PCBs were below 1 at the Reference, BMI-1, and BMI-2. The HQ calculated for BMI-4 was 1.3 and for BMI-6 was 5.0.

8.0 UNCERTAINTY ANALYSIS

There are factors inherent in the risk assessment process which contribute to uncertainty and need to be considered when interpreting results. Major sources of uncertainty include natural variability, error, and insufficient knowledge.

Error can be introduced by use of invalid assumptions in the conceptual model. Conservative assumptions were made in light of the uncertainty associated with the risk assessment process. This was done to minimize the possibility of concluding that no risk is present when a threat actually does exist (e.g., elimination of false negatives). Whenever possible, risk calculations were based on conservative values. For example, NOAELs used to calculate HQs were the lowest values found in the literature, regardless of toxic mechanism.

An important contributor to uncertainty is the incompleteness of the data or information upon which the risk assessment is based. Risk calculations are based on mean COC levels in sediment, water, and soil samples.

Literature values for the toxicity of COCs were not available for all receptor species. An attempt was made to identify studies using closely related species to make risk estimates for the selected receptors. Species respond differently to exposure to toxins; responses to COCs by the indicator species may be different from species for which the toxicity data are reported. Methodological problems were also apparent in several of the studies from which NOAELs were obtained. Unfortunately, studies which were more suitable for this assessment were not found for some of the selected receptors.

A literature search was conducted to identify appropriate NOAELs and LOAELs for this risk assessment. The values used to calculate HQs were the lowest values found in the literature. In many of the studies reviewed, adverse effects were observed at the lowest exposure concentration. This made it impossible to identify appropriate NOAELs for some receptors. In these cases, a factor of 10 was used to convert the LOAEL to a NOAEL, which adds uncertainty to the NOAEL-based calculations.

Doses in toxicological studies can be reported in units of mg contaminant/kg diet, or in units of mg contaminant/kg body weight/day. All doses reported as mg/kg in diet were converted to units of mg/kg BW/day. If body weights were reported for the test animals in a given study, these values were used for making this conversion. Otherwise, the body weight and ingestion rate for the species reported in other literature sources were used.

Another source of uncertainty arises from the use of toxicity values reported in the literature which are derived from single-species, single-contaminant laboratory studies. Prediction of ecosystem effects from laboratory studies is difficult. Laboratory studies cannot take into account the effects of environmental

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factors which may add to the effects of contaminant stress. NOAELs were generally selected from studies using single contaminant exposure scenarios. Species utilizing the Avtex Fibers site are exposed to a variety of contaminants.

There is very little information available in the literature regarding the rates of incidental soil/sediment ingestion for wildlife species. In this risk assessment, most of these values were based on estimates reported for species similar to the indicator species.

Exposure concentrations were calculated (daily intake as described in Section 3) for each target receptor species based on levels of contaminants detected in site media, daily food ingestion rates, incidental soil/sediment ingestion rates, and body weight reported in the literature.

This ecological risk assessment was conducted with the intent of completing a baseline risk assessment. In this risk evaluation it is concluded that a "potential ecological risk" exists if the HQ calculated from the mean area concentration and the NOAEL equals or exceeds one. Within the calculation spreadsheets, alternate calculations were made using LOAEL toxicity benchmarks.

9.0 CONCLUSIONS

9.1 **Assessment Endpoint No. 1** - Protection of benthic invertebrate communities to maintain species diversity and nutrient cycling (trophic structure), to provide a food source for higher level consumers, and to insure that contaminant levels in benthic invertebrate tissues are low enough to minimize the risk of bioaccumulation and/or other negative toxic effects in higher trophic levels.

Sediment, water, benthic macroinvertebrates, and fingernail clams were collected from the South Fork of the Shenandoah River. In addition, sediment samples were analyzed using *C. tentans* and *H. azteca* toxicity tests. A review of the chemistry, benthic community composition, and toxicity test results indicate that the survival of the macroinvertebrate community is not at risk in the river. Although fingernail clams are accumulating PCBs, these levels could not be linked with an effect. The highest concentration of PCBs were detected in the clams collected downstream of the Treatment Plant discharge. This indicates that the water being discharged from the Treatment Plant may be a source of PCBs.

There was at least some response from *H. azteca* or *C. tentans* to the sediments collected from Sulfate Basin No. 5, the Emergency Pond, Fly Ash Basin No. 6, or the Polishing Pond.

There was no significant reduction in survival or growth of *C. dubia* exposed to water samples collected from the on-site basins.

9.2 **Assessment Endpoint No. 2** - Protection of fish communities to insure that ingestion of contaminants by forage fish does not have a negative impact on growth, survival, and reproductive success. Additionally, to insure that contaminant levels accumulated in fish tissues are low enough to minimize the risk of accumulation and negative effect in higher trophic levels.

Polychlorinated biphenyls were detected in every redbreast tissue sample and the concentrations increased in a downstream direction. The concentration of PCBs found in redbreast sunfish exceed levels where adverse effects were observed in studies reported inthe literature. In addition, the concentration of PCBs in redbreast tissue samples are high enough to cause the HQs calculated for smallmouth bass to be greater than one at river locations BMI-2, BMI-4, and BMI-6.

Polychlorinated biphenyls were also detected in every carp collected from Sulfate Basin No. 5. In

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addition, toxicity tests conducted with *P. promelas* show a reduction in survival in the Polishing Pond and Fly Ash Basin No. 6.–Also, the water quality in the Emergency Pond and Polishing Pond exceed the ambient water quality criteria for Zn.

9.3 **Assessment Endpoint No. 3** - Protection of piscivorous birds to insure that ingestion of contaminants in forage fish does not have a negative impact on growth, survival, and reproductive success.

Hazard quotients were calculated to determine risk due to the ingestion of fish captured in the river and in Sulfate Basin No. 5 to the kingfisher. The results indicate HQs greater than one for the exposure to PCBs in fish samples collected from the river locations BMI-2, BMI-4, and BMI-6. In addition, HQs were greater than 1 for Cu and Hg in samples collected from the river.

When compared to a NOAEL, HQs were greater than one for Cr, Cu, and Zn for Sulfate Basin No. 5. The HQ calculated for PCBs from Sulfate Basin No. 5 was below 1.

9.4 **Assessment Endpoint No. 4** - Protection of worm-eating birds to insure that ingestion of contaminants in earthworms does not have a negative impact on growth, survival, and reproductive success. The second part of this assessment endpoint is to insure that the accumulation of contaminants in soil invertebrates (earthworms) does not have a negative impact on growth, survival, and reproductive success.

Soil samples collected on site were tested in a 14-day and 28-day earthworm toxicity test. The results indicate no significant reduction in the survival of the worms. At the end of the test, the worms did accumulate both metals and PCBs. However, the levels accumulated in the worm tissue were lower than those levels found to cause effects reported in literature studies.

Hazard quotients calculated to determine the exposure to woodcock to PCBs indicated that the HQs exceeded one using NOAEL concentrations only at the PCB Spill Area. The HQs calculated for As, Cu, Pb, Hg, and Zn were above 1 for at least one on-site location.

9.5 **Assessment Endpoint No. 5** - Protection of carnivorous birds to insure that ingestion of contaminants in prey does not have a negative impact on growth, survival, and reproductive success.

Hazard quotients calculated for the exposure of red-tailed hawk to NOAELs indicate HQs less than one for PCBs from all terrestrial locations. In addition, the HQ is greater than one for exposure to Cu, Pb, Hg, and Zn at least in 1 on-site location.

9.6 **Assessment Endpoint No. 6** - Protection of carnivorous mammals to insure that ingestion of contaminants in prey does not have a negative impact on growth, survival, and reproductive success.

The ingestion based models to red fox indicated HQs less than 1 for PCBs using a NOAEL. The HQs were greater than 1 for As, Cr, and Pb at least 1 location. An ingestion model was also used for the exposure to mink. This model indicated HQs greater than one for PCBs at BMI-4 and BMI-6. The HQs for Hg were greater than 1 at all river locations.

9.7 **Assessment Endpoint No. 7** - Protection of omnivorous mammals to insure that ingestion of contaminants in forage does not have a negative impact on growth, survival, and reproductive success, to provide a food source for higher level consumers, and to insure that contaminant levels in omnivore tissues are low enough to minimize the risk of bioaccumulation and/or other negative toxic effects in higher trophic levels.

Small mammals were trapped from four areas on site. Whole body analysis of the mammals indicated that metals and PCBs have accumulated in the tissue. The levels of metals found in the tissues were lower than those found in animals collected from reference areas of other scientific studies (Talmage and Watson 1991). However, one animal had a PCB concentration (Aroclor 1260 of 6.3 mg/kg, dry weight) greater than the levels found in the literature to cause effects. There were no abnormal histopathological problems.

The HQs calculated based on the ingestion of fish and clams collected from BMI-4 and BMI-6 were greater than 1 for the exposure of raccoons to PCBs. The HQs for Cr, Pb, and Hg were greater than 1 in at least one location.

10.0 SUMMARY

Based on the results of the risk assessment, sediment and water samples collected from the South Fork of the Shenandoah River do not impact the survival of benthic macroinvertebrates; however, fingernail clams are accumulating PCBs. The highest concentration of PCBs were detected in the clams collected downstream of the Wastewater Treatment Plant discharge (BMI-4). This potentially indicates that water being discharged from the Wastewater Treatment Plant may be a source of PCBs.

Fish samples collected from the South Fork of the Shenandoah River contained elevated levels of PCBs. These levels increase in a downstream direction and ingestion of these fish may impact carnivorous fish, piscivorous birds, and piscivorous mammals.

Sediment samples collected from Sulfate Basin No. 5, Fly Ash Basin No. 6, Emergency Pond, Polishing Pond, and Viscose Creek have some impact (either reduced survival or reduced growth) on sediment invertebrates. These effects appear to be related to the direct toxicity of the metal concentrations. Sediment samples from Sulfate Basin No. 1 do not seem to have an effect on biota.

Small mammals collected on site are accumulating PCBs. However, HQs calculated for carnivorous mammals and birds did not exceed one for the exposure to PCBs. Red fox (carnivorous mammals) are potentially at risk from As and Cr in the Fly Ash Pile, and Pb from the Reference and Wetland Area. Red-tailed hawk (carnivorous bird) are potentially at risk from Cu at all locations, Pb and Hg in the Reference and Wetland Areas, and Zn from the Reference, Wetland, and WWTP Areas.

Based on this baseline risk assessment, it is concluded that "potential" ecological risks exist at the site based on the contaminants evaluated. Metals and PCBs pose a risk to all receptors used in this study for at least one of the areas tested (river, upland soil, or on-site basins).

Based on the other chemistry results, it does not appear that CS_2 or PAHs pose a risk in the media tested. However, CS_2 may be periodically released and because of the nature and volatility of the compound, it may not be detected based on standard analytical techniques.

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Table 1 Sample Locations, Matrices, and Analyses
Avtex Fibers Site
Front Royal, VA
February 1999

Location	Sample No	VOA			BNA		Pest /PCB			TAL			TOC		Grain Size		Water Quality	Toxicity Tests					Redbreast Sunfish (a)	Benthos	Carp (a)	Clams (b)	Mammals (a)
		Soil	Water	Sed	Soil	Sed	Soil	Water	Sed	Soil	Water	Sed	Soil	Sed	Soil	Sed		*P. pimephales*	*C. dubia*	*H. azteca*	*C. tentans*	*E. foetida*					
Reference	501	x			x		x			x			x		x							x(soil)					x(17)
Wetland Area	502	x			x		x			x			x		x							x(soil)					x(4)
Treatment Plant	505	x			x		x			x			x		x							x(soil)					x(7)
Fly Ash Pile	506	x			x		x			x			x		x							x(soil)					x(10)
Emergency Pond (Soil)	503	x			x		x			x			x		x							x(soil)					
PCB Spill Area	504	x			x		x			x			x		x							x(soil)					
Sulfate Basin No 1	601/605		x	x				x	x		x	x		x		x	x	x(w)	x(w)	x(sed)	x(sed)						
Sulfate Basin No 5	044/046		x	x				x	x		x	x		x		x	x	x(w)	x(w)	x(sed)	x(sed)				x(7)		
Fly Ash Basin No 6	045/047		x	x				x	x		x	x		x		x	x	x(w)	x(w)	x(sed)	x(sed)						
Emergency Pond	602/606		x	x				x	x		x	x		x		x	x	x(w)	x(w)	x(sed)	x(sed)						
Polishing Pond	603/607		x	x				x	x		x	x		x		x	x	x(w)	x(w)	x(sed)	x(sed)						
Viscose Creek	608			x					x			x															
Reference No 1	401/410		x	x				x	x		x	x		x		x	x			x	x			x			
Reference No 2	410/419		x	x				x	x		x	x		x		x	x			x	x		x(8)	x		x(2)	
BMI-1 (Outfall 01)	407/411		x	x				x	x		x	x		x		x	x			x	x		x(7)	x		x(2)	
BMI-2 (Outfall 02)	402/412		x	x				x	x		x	x		x		x	x			x	x		x(8)	x		x(2)	
BMI-3 (Outfall 03)	403/413		x	x				x	x		x	x		x		x	x			x	x			x		x(2)	
BMI-4 (Outfall 04/pre discharge)	404/414		x	x				x	x		x	x		x		x	x			x	x		x(8)	x		x(1)	
BMI-4 (Outfall 04/post discharge)	604		x					x			x																
BMI-5 (Outfall 05)	405/415		x	x				x	x		x	x		x		x	x			x	x			x		x(2)	
BMI-6 (Downstream)	406			x					x			x		x		x	x			x	x		x(8)	x			

VOA - Volatile Organic Analysis
BNA - Base, Nuetral, and Acid Extractable Analysis
Pest /PCB - Pesticide/Polychlorinated Biphenyls
TAL - Target Analyte List Metals
TOC - Total Organic Carbon
(a)-Indicates Number of Individuals
(b) - Indicates Number of Replicates

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Table 2. Water Quality Parameters
Avtex Fibers Site
Front Royal, VA
February 1999

Station Units	pH S.U.	Conductivity mS/cm	Turbidity NTU	Dissolved Oxygen mg/L	Temperature C	Hardness mg/L	Salinity ppt
Reference No. 1	8.2	0.23	NA	11.6	15.3	130.0	0.0
Reference No. 2	8.8	0.23	0	12.2	17.1	130.0	0.0
BMI-1 (Outfall 01)	8.5	0.24	NA	10.8	15.0	133.0	0.0
BMI-2 (Outfall 02)	8.7	0.24	NA	11.4	14.9	130.0	0.0
BMI-3 (Outfall 03)	8.9	0.24	NA	10.9	14.8	128.0	0.0
BMI-4 (Outfall 04)	8.5	1.03	8	9.6	13.7	130.0	0.0
BMI-5 (Outfall 05)	8.2	0.31	8	8.5	14.1	128.0	0.0
BMI-6 (Downstream)	NA	NA	NA	NA	NA	NA	NA
Sulfate Basin No. 5	8.1	0.59	3	9.6	15.5	143.0	0.0
Sulfate Basin No. 1	8.9	1.77	3	8.1	15.3	184.0	0.1
Fly Ash Basin No. 6	9.6	0.24	0	11.4	15.5	120.0	0.0
Emergency Pond	8.6	1.80	2	6.2	15.7	229.0	0.1
Polishing Pond	8.1	0.71	31	5.3	15.9	23.0	0.0

pH - standard units (S.U.)
Conductivity - milliSeimens per centimeter (mS/cm)
Turbidity - nephelometric turbidity units (NTUs)
Dissolved Oxygen - milligrams per Liter (mg/L)
Temperature - degrees Celcius (C)
Salinity - parts per thousand (ppt)
Hardness - milligrams calcium carbonate per Liter (mg $CaCO_3$/L)
NA - Not available

Table 3. Results of the Metals Analysis of Water
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00601		00602		00603		00046		00047	
Location	Sulfate Basin No. 1		Emergency Pond		Polishing Pond		Sulfate Basin No. 5		Fly Ash Basin No. 6	
Parameter	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L
Aluminum	140	50	180	50	940	50	U	50	210	50
Antimony	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Arsenic	U	2.2	U	2.2	U	2.2	U	2.2	18	2.2
Barium	25	5.0	22	5.0	62	5.0	66	5.0	28	5.0
Beryllium	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
Cadmium	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0
Calcium	37000	100	52000	100	69000	100	39000	100	30000	100
Chromium	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Cobalt	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Copper	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Iron	220	25	600	25	1900	25	37	25	93	25
Lead	U	4.4	U	2.2	U	2.2	U	4.4	U	4.4
Magnesium	23000	500	24000	500	14000	500	11000	500	11000	500
Manganese	120	3.0	290	3.0	1900	3.0	7.0	3.0	23	3.0
Mercury	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
Nickel	U	10	U	10	U	10	U	10	U	10
Potassium	3600	2000	3900	2000	5400	2000	3800	2000	5400	2000
Selenium	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Silver	U	5.0	5.1	5.0	U	5.0	U	5.0	U	5.0
Sodium	300000	500	310000	500	93000	500	91000	500	7900	500
Thallium	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Vanadium	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Zinc	160	5.0	1700	5.0	240	5.0	120	5.0	U	5.0

MDL denotes Method Detection Limit
U denotes less than the MDL

Table 4. Results of the Analysis of Volatile Organics in On-Site Water
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID / Location	00046 Sulfate Basin No. 5		00047 Fly Ash Basin No. 6		00601 Sulfate Basin No. 1		00602 Emergency Pond		00603 Polishing Pond		00418 Field Blank		00417 Trip Blank	
Compound	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L
Chloromethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Bromomethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Vinyl Chloride	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Chloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Methylene Chloride	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Acetone	R	5	R	5	R	5	R	5	R	5	R	1	7J	1
Carbon Disulfide	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1-Dichloroethene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1-Dichloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Chloroform	U	1	U	1	U	1	U	1	U	1	4	1	U	1
1,2-Dichloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
2-Butanone	U	5	U	5	U	5	U	5	U	5	U	5	U	5
1,1,1-Trichloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Carbon Tetrachloride	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Bromodichloromethane	U	1	U	1	U	1	U	1	U	1	2	1	U	1
1,2-Dichloropropane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
cis-1,3-Dichloropropene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Trichloroethene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Dibromochloromethane	U	1	U	1	U	1	U	1	U	1	0.7J	1	U	1
1,1,2-Trichloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Benzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
trans-1,3-Dichloropropene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Bromoform	U	1	U	1	U	1	U	1	U	1	U	1	U	1
4-Methyl-2-Pentanone	U	5	U	5	U	5	U	5	U	5	U	5	U	5
2-Hexanone	U	5	U	5	U	5	U	5	U	5	U	5	U	5
Tetrachloroethene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Toluene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1,2,2-Tetrachloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Chlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Ethyl Benzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Styrene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
cis-1,2-Dichloroethene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
trans-1,2-Dichloroethene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
m p-Xylenes	U	1	U	1	U	1	U	1	U	1	U	1	U	1
O-Xylene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2-Dibromomethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1,1,2-Tetrachloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2,3-Trichloropropane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Dichlorodifluoromethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Trichlorofluoromethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Dibromomethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2-Dibromo-3-Chloropropane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Bromobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
n-Butylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
tert-Butylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
sec-Butylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
2-Chlorotoluene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
4-Chlorotoluene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,3-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,4-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,3-Dichloropropane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
2,2-Dichloropropane	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1-Dichloropropene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Hexachlorobutadiene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Isopropylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
p-Isopropyltoluene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Naphthalene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
n-Propylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2,3-Trichlorobenzene	U.	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2,4-Trichlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2,4-Trimethylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,3,5-Trimethylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Methyl-tert-Butyl Ether	U	1	U	1	U	1	U	1	U	1	U	1	U	1

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
R denotes data unusable

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Table 5 Results of the Analysis for Pesticides/PCBs in Water
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00046		00047		00601		00602		00603	
Location	Sulfate Basin No. 5		Fly Ash Basin No. 6		Sulfate Basin No. 1		Emergency Pond		Polishing Pond	
Analyte	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc. µg/L	MDL µg/L	Conc. µg/L	MDL µg/L	Conc. µg/L	MDL µg/L
a-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
g-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
b-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Heptachlor	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
d-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Aldrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Heptachlor Epoxide	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
g-Chlordane	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
a-Chlordane	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endosulfan (I)	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
p,p'-D D E	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Dieldrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
p,p'-D D D	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endosulfan (II)	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
p,p'-D D T	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endrin Aldehyde	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endosulfan Sulfate	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Methoxychlor	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endrin Ketone	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Toxaphene	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
Aroclor 1016	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1221	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
Aroclor 1232	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1242	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1248	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1254	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1260	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
R denotes the value is unusable

Table 6 Results of the Metals Analysis of Water
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID Location	00410 Reference No. 1		00419 Reference No. 2		00411 BMI-1 (Outfall 01)		00412 BMI-2 (Outfall 02)		00413 BMI-3 (Outfall 03)		00414 Outfall 4 (Outfall 04/pre)		00604 Outfall 4 (Outfall 04/post)		00415 Outfall 5 (Outfall 05)	
Parameter	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L	Conc ug/L	MDL ug/L
Aluminum	U	50	U	50	U	50	U	50	U	50	U	50	200	50	U	50
Antimony	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Arsenic	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Barium	31	5.0	30	5.0	32	5.0	32	5.0	32	5.0	33	5.0	13	5.0	32	5.0
Beryllium	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
Cadmium	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0
Calcium	34000	100	34000	100	35000	100	34000	100	33000	100	34000	100	24000	100	33000	100
Chromium	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Cobalt	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Copper	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Iron	77	25	76	25	85	25	75	25	73	25	63	25	400	25	59	25
Lead	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	4.4	U	2.2
Magnesium	11000	500	11000	500	11000	500	11000	500	11000	500	11000	500	7300	500	11000	500
Manganese	9.2	3.0	7.6	3.0	18	3.0	16	3.0	12	3.0	7.2	3.0	45	3.0	8.0	3.0
Mercury	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
Nickel	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
Potassium	2800	2000	2600	2000	2500	2000	3000	2000	2900	2000	2700	2000	3700	2000	2700	2000
Selenium	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Silver	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Sodium	7400	500	7200	500	8600	500	8100	500	8000	500	8100	500	270000	500	7800	500
Thallium	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Vanadium	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Zinc	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	59	5.0	U	5.0

MDL denotes Method Detection Limit
U denotes less than the MDL

Table 7. Results of the Analysis of Volatile Organics in River Water
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00410		00419		00411		00412		00413		00414		00604		00415	
Location	Reference No. 1		Reference No. 2		BMI-1 (Outfall 01)		BMI-2 (Outfall 02)		BMI-3 (Outfall 03)		BMI-4 (Outfall 04/pre)		Outfall 004 (Outfall 04/post)		BMI-5 (Outfall 05)	
Compound	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L	ug/L	MDL ug/L
Chloromethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Bromomethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Vinyl Chloride	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Chloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Methylene Chloride	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Acetone	R	5	R	5	R	1	U	1	R	5	R	1	R	5	R	5
Carbon Disulfide	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1-Dichloroethene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1-Dichloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Chloroform	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2-Dichloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
2-Butanone	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5
1,1,1-Trichloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Carbon Tetrachloride	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Bromodichloromethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2-Dichloropropane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
cis-1,3-Dichloropropene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Trichloroethene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Dibromochloromethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1,2-Trichloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Benzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
trans-1,3-Dichloropropene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Bromoform	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
4-Methyl-2-Pentanone	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5
2-Hexanone	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5
Tetrachloroethene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Toluene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1,2,2-Tetrachloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Chlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Ethyl Benzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Styrene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
cis-1,2-Dichloroethene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
trans-1,2-Dichloroethene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
m,p-Xylenes	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
O-Xylene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2-Dibromomethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1,1,2-Tetrachloroethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2,3-Trichloropropane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Dichlorodifluoromethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Trichlorofluoromethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Dibromomethane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2-Dibromo-3-Chloropropane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Bromobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
n-Butylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
tert-Butylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
sec-Butylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
2-Chlorotoluene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
4-Chlorotoluene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,3-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,4-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,3-Dichloropropane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
2,2-Dichloropropane	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,1-Dichloropropene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Hexachlorobutadiene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Isopropylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
p-Isopropyltoluene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Naphthalene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
n-Propylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2,3-Trichlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2,4-Trichlorobenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,2,4-Trimethylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
1,3,5-Trimethylbenzene	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
Methyl-tert-Butyl Ether	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
R denotes data unusable

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Table 8 Results of the Analysis for Pesticides/PCBs in Water
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00410		00419		00411		00412		00413		00414		00604		00415	
Location	Reference No 1		Reference No 2		BMI - 1 (Outfall 01)		BMI - 2 (Outfall 02)		BMI - 3 (Outfall 03)		BMI-4 (Outfall 04/pre)		Outfall 004 (Outfall 04/post)		BMI-5 (Outfall 05)	
Analyte	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc. µg/L	MDL µg/L	Conc. µg/L	MDL µg/L	Conc. µg/L	MDL µg/L	Conc. µg/L	MDL µg/L	Conc. µg/L	MDL µg/L
a-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
g-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
b-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Heptachlor	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
d-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Aldrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Heptachlor Epoxide	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
g-Chlordane	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
a-Chlordane	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Endosulfan (I)	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
p,p'-D D E	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Dieldrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Endrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
p,p'-D D D	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Endosulfan (II)	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
p,p'-D D T	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Endrin Aldehyde	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Endosulfan Sulfate	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Methoxychlor	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Endrin Ketone	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	R	0.02	U	0.02
Toxaphene	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	R	0.5	U	0.5
Aroclor 1016	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	R	0.3	U	0.3
Aroclor 1221	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	R	0.5	U	0.5
Aroclor 1232	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	R	0.3	U	0.3
Aroclor 1242	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	R	0.3	U	0.3
Aroclor 1248	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	R	0.3	U	0.3
Aroclor 1254	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	R	0.3	U	0.3
Aroclor 1260	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	R	0.3	U	0.3

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
R denotes the value is unusable

Table 9 Results of the Metals Analysis in Sediment
Avtex Fibers Site
Front Royal, VA
February 1999

Based on Dry Weight

Client ID	00605		00606		00607		00608		00044		00045	
Location	Sulfate Basin No 1		Emergency Pond		Polishing Pond		Viscose Creek		Sulfate Basin No.5		Fly Ash Basin No.6	
% Solids	35		30		27		62		18		40	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	8300	28	7900	36	17000	39	13000	20	8100	76	14000	23
Antimony	11	9.8	U	13	U	14	U	7.2	30	27	U	8.2
Arsenic	7.5	0.86	8.6	0.93	9.5	1.1	15	0.48	17	2.2	72	0.84
Barium	96	0.98	75	1.3	180	1.4	120	0.72	100	2.7	510	0.82
Beryllium	0.79	0.66	U	0.84	1.6	0.91	1.3	0.48	U	1.8	4.4	0.54
Cadmium	3.6	0.82	8.1	1.0	10	1.1	0.82	0.60	6.3	2.2	U	0.68
Calcium	120000	82	96000	100	41000	110	41000	60	40000	220	3700	68
Chromium	44	0.82	48	1.0	67	1.1	160	0.60	130	2.2	21	0.68
Cobalt	11	0.82	12	1.0	23	1.1	24	0.60	8.2	2.2	17	0.68
Copper	43	1.5	77	1.9	130	2.0	98	1.1	50	4.0	54	1.2
Iron	17000	15	18000	19	38000	20	47000	11	17000	40	18000	12
Lead	120	6.6	180	8.4	140	9.1	180	4.8	390	18	20	5.4
Magnesium	4000	82	2900	100	4000	110	1300	60	1400	220	930	68
Manganese	690	0.82	690	1.0	1400	1.1	960	0.60	470	2.2	100	0.68
Mercury	1.1	0.08	0.91	0.07	1.1	0.12	0.39	0.02	U	0.14	0.45	0.05
Nickel	25	1.6	34	2.1	53	2.3	120	1.2	27	4.5	30	1.4
Potassium	490	330	440	420	1300	460	490	240	U	900	1900	270
Selenium	U	0.86	U	0.93	U	1.1	1.0	0.48	U	2.2	5.8	0.84
Silver	U	0.82	U	1.0	U	1.1	U	0.60	U	2.2	U	0.68
Sodium	1700	82	1600	100	500	110	8600	60	740	220	320	68
Thallium	U	0.86	U	0.93	U	1.1	U	0.48	U	2.2	1.7	0.84
Vanadium	25	1.6	26	2.1	59	2.3	60	1.2	29	4.5	69	1.4
Zinc	27000	3.3	44000	4.2	43000	4.6	470	2.4	170000	45	110	2.7

MDL denotes Method Detection Limit
U denotes less than the MDL

Table 10. Results of the Analysis of Volatile Organics in On-Site Sediment
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID / Location / Percent Solid	00044 Sulfate Basin No. 5 (22)		00045 Fly Ash Basin No. 6 (27)		00605 Sulfate Basin No. 1 (33)		00606 Emergency Pond (24)		00607 Polishing Pond (23)		00608 Viscose Creek (64)	
Compound	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg
Chloromethane	U	23	U	18	U	15	U	21	U	22	U	8
Bromomethane	U	23	U	18	U	15	U	21	U	22	U	8
Vinyl Chloride	U	23	U	18	U	15	U	21	U	22	U	8
Chloroethane	U	23	U	18	U	15	U	21	U	22	U	8
Methylene Chloride	U	23	U	18	U	15	55J	21	29J	22	7J	8
Acetone	120J	23	470J	18	150	15	250J	21	330J	22	60J	8
Carbon Disulfide	10J	23	U	18	U	15	19J	21	U	22	U	8
1,1-Dichloroethene	U	23	U	18	U	15	U	21	U	22	U	8
1,1-Dichloroethane	U	23	U	18	U	15	U	21	U	22	U	8
Chloroform	U	23	U	18	U	15	U	21	U	22	U	8
1,2-Dichloroethane	U	23	U	18	U	15	U	21	U	22	U	8
2-Butanone	36J	23	140J	18	33	15	18J	21	44J	22	13J	8
1,1,1-Trichloroethane	U	23	U	18	U	15	U	21	U	22	U	8
Carbon Tetrachloride	U	23	U	18	U	15	U	21	U	22	U	8
Bromodichloromethane	U	23	U	18	U	15	U	21	U	22	U	8
1,2-Dichloropropane	U	23	U	18	U	15	U	21	U	22	U	8
cis-1,3-Dichloropropene	U	23	U	18	U	15	U	21	U	22	U	8
Trichloroethene	U	23	U	18	U	15	U	21	U	22	U	8
Dibromochloromethane	U	23	U	18	U	15	U	21	U	22	U	8
1,1,2-Trichloroethane	U	23	U	18	U	15	U	21	U	22	U	8
Benzene	3J	23	U	18	U	15	14J	21	U	22	U	8
trans-1,3-Dichloropropene	U	23	U	18	U	15	U	21	U	22	U	8
Bromoform	U	23	U	18	U	15	U	21	U	22	U	8
4-Methyl-2-Pentanone	U	23	U	18	U	15	U	21	U	22	U	8
2-Hexanone	U	23	U	18	U	15	U	21	U	22	U	8
Tetrachloroethene	U	23	U	18	U	15	U	21	U	22	U	8
Toluene	3J	23	U	18	U	15	99J	21	36J	22	10J	8
1,1,2,2-Tetrachloroethane	U	23	U	18	U	15	U	21	U	22	U	8
Chlorobenzene	U	23	U	18	U	15	U	21	U	22	U	8
Ethyl Benzene	U	23	U	18	U	15	U	21	10J	22	U	8
Styrene	U	23	U	18	U	15	U	21	U	22	U	8
cis-1,2-Dichloroethene	U	23	U	18	U	15	U	21	U	22	U	8
trans-1,2-Dichloroethene	U	23	U	18	U	15	U	21	U	22	U	8
m,p-Xylenes	U	23	U	18	U	15	70J	21	33J	22	8J	8
O-Xylene	5J	23	U	18	U	15	14J	21	10J	22	U	8
1,2-Dibromomethane	U	23	U	18	U	15	U	21	U	22	U	8
1,1,1,2-Tetrachloroethane	U	23	U	18	U	15	U	21	U	22	U	8
1,2,3-Trichloropropane	U	23	U	18	U	15	U	21	U	22	U	8
Dichlorodifluoromethane	U	23	U	18	U	15	U	21	U	22	U	8
Trichlorofluoromethane	U	23	U	18	U	15	U	21	U	22	U	8
Dibromomethane	U	23	U	18	U	15	U	21	U	22	U	8
1,2-Dibromo-3-Chloropropane	U	23	U	18	U	15	U	21	U	22	U	8
Bromobenzene	U	23	U	18	U	15	U	21	U	22	U	8
n-Butylbenzene	U	23	U	18	U	15	U	21	U	22	U	8
tert-Butylbenzene	U	23	U	18	U	15	U	21	U	22	U	8
sec-Butylbenzene	U	23	U	18	U	15	U	21	U	22	U	8
2-Chlorotoluene	U	23	U	18	U	15	U	21	U	22	U	8
4-Chlorotoluene	U	23	U	18	U	15	U	21	U	22	U	8
1,2-Dichlorobenzene	U	23	U	18	U	15	U	21	U	22	U	8
1,3-Dichlorobenzene	U	23	U	18	U	15	U	21	U	22	U	8
1,4-Dichlorobenzene	U	23	R	18	U	15	R	21	U	22	U	8
1,3-Dichloropropane	U	23	U	18	U	15	U	21	U	22	U	8
2,2-Dichloropropane	U	23	U	18	U	15	U	21	U	22	U	8
1,1-Dichloropropene	U	23	U	18	U	15	U	21	U	22	U	8
Hexachlorobutadiene	U	23	U	18	U	15	U	21	U	22	U	8
Isopropylbenzene	U	23	U	18	U	15	U	21	U	22	U	8
p-Isopropyltoluene	U	23	U	18	U	15	U	21	U	22	U	8
Naphthalene	U	23	200J	18	U	15	U	21	U	22	U	8
n-Propylbenzene	U	23	U	18	U	15	U	21	U	22	U	8
1,2,3-Trichlorobenzene	U	23	U	18	U	15	U	21	U	22	U	8
1,2,4-Trichlorobenzene	U	23	U	18	U	15	U	21	U	22	U	8
1,2,4-Trimethylbenzene	0.7J	23	U	18	U	15	58J	21	20J	22	4J	8
1,3,5-Trimethylbenzene	U	23	U	18	U	15	33J	21	14J	22	4J	8
Methyl-tert-Butyl Ether	U	23	U	18	U	15	U	21	U	22	U	8

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
R denotes data is unusable

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Table 11 Results of the Analysis for Pesticides/PCBs in Sediment
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00605		00607		00608		00606		00044		00045	
Location	Sulfate Basin No 1		Polishing Pond		Viscose Creek		Emergency Pond		Sulfate Basin No 5		Fly Ash Basin No 6	
% Solid	34		27		61		31		16		40	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
a-BHC	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
g-BHC	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
b-BHC	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Heptachlor	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
d-BHC	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Aldrin	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Heptachlor Epoxide	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
g-Chlordane	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
a-Chlordane	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Endosulfan (I)	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
p,p'-D D E	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Dieldrin	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Endrin	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
p,p'-D D D	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Endosulfan (II)	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
p,p'-D D T	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Endrin Aldehyde	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Endosulfan Sulfate	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Methoxychlor	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Endrin Ketone	U	9.80	U	13.00	U	5.40	U	11.00	U	21.00	U	8.40
Toxaphene	U	240.0	U	310.0	U	140.0	U	270.0	U	530.0	U	210.0
Aroclor 1016	U	120.0	U	160.0	U	68.0	U	130.0	U	270.0	U	100.0
Aroclor 1221	U	240.0	U	310.0	U	140.0	U	270.0	U	530.0	U	210.0
Aroclor 1232	U	120.0	U	160.0	U	68.0	U	130.0	U	270.0	U	100.0
Aroclor 1242	U	120.0	U	160.0	U	68.0	U	130.0	U	270.0	U	100.0
Aroclor 1248	U	120.0	U	160.0	U	68.0	450	130.0	U	270.0	U	100.0
Aroclor 1254	U	120.0	2200J	160.0	U	68.0	U	130.0	U	270.0	U	100.0
Aroclor 1260	U	120.0	3000J	160.0	U	68.0	400	130.0	U	270.0	U	100.0

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 12. Results of the Grain Size Analysis, Total Organic Carbon, and Percent Moisture of On-Site Sediment
Avtex Fibers Site
Front Royal, VA
February 1999

Description	Sample ID Location Particle Size (%)	44 Sulfate Basin No. 5	45 Fly Ash Basin No. 6	605 Sulfate Basin No. 1	606 Emergency Pond	607 Polishing Pond	608 Viscose Creek
Gravel	4.75 - 76.2 mm	4.3	0	0	0.1	0	0
Sand	0.075 - 4.74 mm	36	24	28	27.5	50.2	40.6
Silt	0.005 - 0.074 mm	33.3	57.4	43.6	46.1	27.8	36.9
Clay	0.001 - 0.004 mm	14.8	17.3	18.9	15.2	12.4	11.7
Colloids	< 0.001 mm	11.6	1.3	9.5	11	9.6	10.8
Percent Moisture		84.3	54.6	67.5	25.1	69.6	38.4
Percent Organic Matter		32.6	13.8	10.2	1.9	9.8	5.7

Table 13 Results of the Metals Analysis in River Sediment
Avtex Fibers Site
Front Royal, VA
February 1999

Based on Dry Weight

Client ID	00401		00410		00407		00402		00403		00404		00405		00406	
Location	Reference No. 1		Reference No. 2		BMI-1 (Outfall 01)		BMI-2 (Outfall 02)		BMI-3 (Outfall 03)		BMI-4 (Outfall 04)		BMI-5 (Outfall 05)		BMI-6 (Downstream)	
% Solids	26		56		55		61		74		64		66		72	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	9100	42	14000	13	5400	23	4600	18	3000	16	4100	13	4200	17	2800	15
Antimony	U	15	U	46	U	8.0	U	6.5	U	5.5	U	4.5	U	6.1	U	5.2
Arsenic	4.7	1.1	3.8	0.55	6.0	0.56	2.9	0.50	1.5	0.47	4.3	0.57	4.6	0.51	1.3	0.47
Barium	93	1.5	120	0.46	54	0.80	40	0.65	29	0.55	35	0.45	43	0.61	27	0.52
Beryllium	U	1.0	1.2	0.30	0.62	0.53	0.49	0.43	U	0.37	0.44	0.30	0.50	0.41	U	0.35
Cadmium	U	1.2	U	0.38	U	0.67	U	0.54	U	0.46	U	0.37	U	0.51	U	0.43
Calcium	14000	120	5500	38	7100	67	6600	54	1900	46	12000	37	3200	51	2300	43
Chromium	19	1.2	24	0.38	15	0.67	13	0.54	12	0.46	18	0.37	19	0.51	9.6	0.43
Cobalt	9.9	1.2	13	0.38	7.9	0.67	6.6	0.54	5.8	0.46	6.9	0.37	7.7	0.51	5.0	0.43
Copper	16	2.2	22	0.69	10	1.2	7.9	0.97	11	0.83	7.0	0.67	11	0.92	4.2	0.78
Iron	21000	22	25000	6.9	16000	12	14000	9.7	16000	8.3	17000	6.7	15000	9.2	12000	7.8
Lead	16	10	22	3.0	21	5.3	12	4.3	10	3.7	7.1	3.0	21	4.1	7.4	3.5
Magnesium	2300	120	2300	38	1600	67	1400	54	880	46	1900	37	980	51	800	43
Manganese	670	1.2	600	0.38	570	0.67	280	0.54	210	0.46	360	0.37	390	0.51	130	0.43
Mercury	0.54	0.10	0.87	0.05	0.26	0.04	0.19	0.03	0.25	0.003	0.05	0.03	0.21	0.03	0.07	0.03
Nickel	13	2.5	15	0.76	8.9	1.3	7.3	1.1	7.6	0.92	6.6	0.75	11	1.0	5.0	0.87
Potassium	1100	500	870	150	430	270	400	220	270	180	310	150	350	200	310	170
Selenium	U	1.1	U	0.55	U	0.56	U	0.50	U	0.47	U	0.57	U	0.51	U	0.47
Silver	U	1.2	U	0.38	U	0.67	U	0.54	U	0.46	U	0.37	U	0.51	U	0.43
Sodium	140	120	44	38	130	67	340	54	130	46	U	37	63	51	U	43
Thallium	U	1.1	U	0.55	U	0.56	U	0.50	U	0.47	U	0.53	U	0.51	U	0.47
Vanadium	26	2.5	36	0.76	19	1.3	16	1.1	14	0.92	20	0.75	19	1.0	14	0.87
Zinc	69	5.0	78	1.5	59	2.7	49	2.2	87	1.8	45	1.5	120	2.0	35	1.7

MDL denotes Method Detection Limit
U denotes less than the MDL

Table 14. Results of the Analyses of Volatile Organics in River Sediment
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00401		00410		0407		00402		00403		00404		00405		00406	
Location	Reference No. 1		Reference No. 2		BMI-1 (Outfall 01)		BMI-2 (Outfall 02)		BMI-3 (Outfall 03)		BMI-4 (Outfall 04)		BMI-5 (Outfall 05)		BMI-6 (Downstream)	
Percent Solid	20		64		48		42		68		60		65		64	
Compound	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg
Chloromethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Bromomethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Vinyl Chloride	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Chloroethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Methylene Chloride	U	25	U	8	U	10	U	12	U	7	U	8	4J	8	5J	8
Acetone	800J	25	U	8	64	10	42	12	14	7	110J	8	28	8	60	8
Carbon Disulfide	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,1-Dichloroethene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,1-Dichloroethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Chloroform	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,2-Dichloroethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
2-Butanone	100J	25	U	8	U	10	U	12	U	7	18J	8	U	8	13	8
1,1,1-Trichloroethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Carbon Tetrachloride	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Bromodichloromethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,2-Dichloropropane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
cis-1,3-Dichloropropene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Trichloroethene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Dibromochloromethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,1,2-Trichloroethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Benzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
trans-1,3-Dichloropropene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Bromoform	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
4-Methyl-2-Pentanone	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
2-Hexanone	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Tetrachloroethene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Toluene	10J	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,1,2,2-Tetrachloroethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Chlorobenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Ethyl Benzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Styrene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
cis-1,2-Dichloroethene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
trans-1,2-Dichloroethene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
m,p-Xylenes	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
O-Xylene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,2-Dibromomethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,1,1,2-Tetrachloroethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,2,3-Trichloropropane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Dichlorodifluoromethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Trichlorofluoromethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Dibromomethane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,2-Dibromo-3-Chloropropane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Bromobenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
n-Butylbenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
tert-Butylbenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
sec-Butylbenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
2-Chlorotoluene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
4-Chlorotoluene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,2-Dichlorobenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,3-Dichlorobenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,4-Dichlorobenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,3-Dichloropropane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
2,2-Dichloropropane	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,1-Dichloropropene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Hexachlorobutadiene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Isopropylbenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
p-Isopropyltoluene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Naphthalene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
n-Propylbenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,2,3-Trichlorobenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,2,4-Trichlorobenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,2,4-Trimethylbenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
1,3,5-Trimethylbenzene	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8
Methyl-tert-Butyl Ether	U	25	U	8	U	10	U	12	U	7	U	8	U	8	U	8

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
R denotes data is unusable

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Table 15 Results of the Analysis for Pesticides/PCBs in Sediment
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00401		00410		00407		00402		00403		00404		00405		00406	
Location	Reference No 1		Reference No 2		BMI - 1 (Outfall 01)		BMI - 2 (Outfall 02)		BMI - 3 (Outfall 03)		BMI - 4 (Outfall 04)		BMI - 5 (Outfall 05)		BMI - 6 (Downstream)	
% Solid	27		65		57		67		80		78		72		72	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
a-BHC	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
g-BHC	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
b-BHC	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Heptachlor	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
d-BHC	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Aldrin	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Heptachlor Epoxide	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
g-Chlordane	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
a-Chlordane	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Endosulfan (I)	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
p,p'-D D E	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Dieldrin	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Endrin	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
p,p'-D D D	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Endosulfan (II)	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
p,p'-D D T	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Endrin Aldehyde	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Endosulfan Sulfate	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Methoxychlor	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Endrin Ketone	U	12.00	U	5.10	U	5.80	U	4.90	U	4.20	U	4.30	U	4.60	U	4.60
Toxaphene	U	300.0	U	130.0	U	140.0	U	120.0	U	100.0	U	110.0	U	110.0	U	110.0
Aroclor 1016	U	150.0	U	64.0	U	72.0	U	62.0	U	52.0	U	54.0	U	57.0	U	57.0
Aroclor 1221	U	300.0	U	130.0	U	140.0	U	120.0	U	100.0	U	110.0	U	110.0	U	110.0
Aroclor 1232	U	150.0	U	64.0	U	72.0	U	62.0	U	52.0	U	54.0	U	57.0	U	57.0
Aroclor 1242	U	150.0	U	64.0	U	72.0	U	62.0	U	52.0	U	54.0	U	57.0	U	57.0
Aroclor 1248	U	150.0	U	64.0	U	72.0	U	62.0	U	52.0	U	54.0	U	57.0	U	57.0
Aroclor 1254	U	150.0	U	64.0	U	72.0	U	62.0	U	52.0	U	54.0	U	57.0	U	57.0
Aroclor 1260	U	150.0	U	64.0	U	72.0	U	62.0	U	52.0	U	54.0	470	57.0	U	57.0

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 16. Results of the Grain Size Analysis, Total Organic Carbon, and Percent Moisture of River Sediment
Avtex Fibers Site
Front Royal, VA
February 1999

Description	Sample ID Location Particle Size (%)	401 Reference No. 1	410 Reference No. 2	407 BMI-1 (Outfall 01)	402 BMI-2 (Outfall 02)	403 BMI-3 (Outfall 03)	404 BMI-4 (Outfall 04)	405 BMI-5 (Outfall 05)	406 BMI-6 (Downstream)
Gravel	4.75 - 76.2 mm	2.8	0	0	0	0	5.5	0	0
Sand	0.075 - 4.74 mm	51.5	51.4	70.6	83.1	86.5	85.5	84.7	87.2
Silt	0.005 - 0.074 mm	34.9	23.3	20.6	13.8	11.9	7.8	9.2	11.2
Clay	0.001 - 0.004 mm	3.9	12.1	4.4	1.5	1.6	1.2	3	1.6
Colloids	<0.001 mm	6.8	13.2	4.4	1.6	0	0	3	0
Percent Moisture		71.5	34.6	43.9	37.4	21.4	27.8	28.7	22.1
Percent Organic Matter		12.2	4	4.8	4.5	1	2	2.2	1

Table 17. Results of the Metals Analysis in Soil
Avtex Fibers Site
Front Royal, VA
February 1999

Based on Dry Weight

Client ID		00501		504		00505		00506		00502		00503	
Location		Reference		PCB Spill Area		Treatment Plant		Fly Ash Pile		Wetland Area		Emergency Pond	
% Solids		85		81		80		60		81		72	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	8200	11	13000	17	8600	20	13000	23	16000	17	3300	19
Antimony	ICAP	U	4.0	U	6.0	U	7.0	U	8.2	U	6.0	U	6.7
Arsenic	AA-Fur	5.3	0.73	15	0.51	3.7	1.2	75	0.65	4.7	1.0	2.1	0.50
Barium	ICAP	49	0.40	46	0.60	120	0.70	1100	0.82	59	0.60	29	0.67
Beryllium	ICAP	0.83	0.26	0.73	0.4	1.2	0.47	4.1	0.55	1.7	0.40	U	0.45
Cadmium	ICAP	U	0.33	0.92	0.5	U	0.59	U	0.69	U	0.50	U	0.56
Calcium	ICAP	27000	33	19000	50	3000	59	1700	69	2000	50	1200	56
Chromium	ICAP	15	0.33	15	0.5	15	0.59	21	0.69	16	0.50	9.2	0.56
Cobalt	ICAP	8.8	0.33	11	0.5	17	0.59	15	0.69	12	0.50	6.1	0.56
Copper	ICAP	14	0.59	17	0.89	16	1.1	46	1.2	42	0.89	6.1	1.0
Iron	ICAP	25000	5.9	25000	8.9	26000	11	36000	12	58000	8.9	12000	10
Lead	ICAP	20	2.6	32	4	25	4.7	15	5.5	27	4.0	9.1	4.5
Magnesiu	ICAP	11000	33	6100	50	1500	59	970	69	610	50	850	56
Manganes	ICAP	130	0.33	49	0.5	1100	0.59	110	0.69	130	0.50	920	0.56
Mercury	Cold Vapor	U	0.04	U	0.02	0.34	0.04	0.60	0.05	0.07	0.04	0.25	0.03
Nickel	ICAP	12	0.66	19	0.99	13	1.2	30	1.4	18	0.99	5.9	1.1
Potassium	ICAP	430	130	310	200	680	230	2600	270	340	200	330	220
Selenium	AA-Fur	U	0.37	U	0.51	U	0.58	6.3	0.65	U	0.37	U	0.50
Silver	ICAP	U	0.33	U	0.5	U	0.59	U	0.69	U	0.50	U	0.56
Sodium	ICAP	48	33	U	50	310	59	360	69	U	50	340	56
Thallium	AA-Fur	U	0.37	U	0.51	U	0.58	1.6	0.65	U	0.52	U	0.50
Vanadium	ICAP	38	0.66	45	0.99	37	1.2	68	1.4	40	0.99	12	1.1
Zinc	ICAP	110	1.3	410	2	710	2.3	36	2.7	57	2.0	53	2.2

MDL denotes Method Detection Limit
U denotes less than the MDL

Table 18. Results of the Analysis of Volatile Organics in Soil
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00501		00502		00503		00504		00505		00506	
Location	Reference		Wetland Area		Emergency Pond		PCB Spill Area		Treatment Plant		Fly Ash Pile	
Percent Solid	84		78		74		78		80		60	
Compound	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg	ug/kg	MDL ug/kg
Chloromethane	U	6	U	6	U	7	U	6	U	6	R	8
Bromomethane	U	6	U	6	U	7	U	6	U	6	R	8
Vinyl Chloride	U	6	U	6	U	7	U	6	U	6	R	8
Chloroethane	U	6	U	6	U	7	U	6	U	6	R	8
Methylene Chloride	U	6	U	6	U	7	4J	6	3J	6	R	8
Acetone	U	6	U	6	U	7	U	6	U	6	190J	8
Carbon Disulfide	U	6	U	6	U	7	U	6	U	6	R	8
1,1-Dichloroethene	U	6	U	6	U	7	U	6	U	6	R	8
1,1-Dichloroethane	U	6	U	6	U	7	U	6	U	6	R	8
Chloroform	U	6	U	6	U	7	U	6	U	6	19J	8
1,2-Dichloroethane	U	6	U	6	U	7	U	6	U	6	R	8
2-Butanone	U	6	U	6	U	7	U	6	U	6	R	8
1,1,1-Trichloroethane	U	6	U	6	U	7	U	6	U	6	R	8
Carbon Tetrachloride	U	6	U	6	U	7	U	6	U	6	R	8
Bromodichloromethane	U	6	U	6	U	7	U	6	U	6	R	8
1,2-Dichloropropane	U	6	U	6	U	7	U	6	U	6	R	8
cis-1,3-Dichloropropene	U	6	U	6	U	7	U	6	U	6	R	8
Trichloroethene	U	6	U	6	U	7	U	6	U	6	R	8
Dibromochloromethane	U	6	U	6	U	7	U	6	U	6	R	8
1,1,2-Trichloroethane	U	6	U	6	U	7	U	6	U	6	R	8
Benzene	U	6	U	6	U	7	U	6	U	6	R	8
trans-1,3-Dichloropropene	U	6	U	6	U	7	U	6	U	6	R	8
Bromoform	U	6	U	6	U	7	U	6	U	6	R	8
4-Methyl-2-Pentanone	U	6	U	6	U	7	U	6	U	6	R	8
2-Hexanone	U	6	U	6	U	7	U	6	U	6	R	8
Tetrachloroethene	U	6	U	6	U	7	U	6	U	6	R	8
Toluene	U	6	U	6	U	7	U	6	U	6	R	8
1,1,2,2-Tetrachloroethane	U	6	U	6	U	7	U	6	U	6	R	8
Chlorobenzene	U	6	U	6	U	7	U	6	U	6	R	8
Ethyl Benzene	U	6	U	6	U	7	U	6	U	6	R	8
Styrene	U	6	U	6	U	7	U	6	U	6	R	8
cis-1,2-Dichloroethene	U	6	U	6	U	7	U	6	U	6	R	8
trans-1,2-Dichloroethene	U	6	U	6	U	7	U	6	U	6	R	8
m,p-Xylenes	U	6	U	6	U	7	U	6	U	6	R	8
O-Xylene	U	6	U	6	U	7	U	6	U	6	R	8
1,2-Dibromomethane	U	6	U	6	U	7	U	6	U	6	R	8
1,1,1,2-Tetrachloroethane	U	6	U	6	U	7	U	6	U	6	R	8
1,2,3-Trichloropropane	U	6	U	6	U	7	U	6	U	6	R	8
Dichlorodifluoromethane	U	6	U	6	U	7	U	6	U	6	R	8
Trichlorofluoromethane	U	6	U	6	U	7	U	6	U	6	R	8
Dibromomethane	U	6	U	6	U	7	U	6	U	6	R	8
1,2-Dibromo-3-Chloropropane	U	6	U	6	U	7	U	6	U	6	R	8
Bromobenzene	U	6	U	6	U	7	U	6	U	6	R	8
n-Butylbenzene	U	6	U	6	U	7	U	6	U	6	R	8
tert-Butylbenzene	U	6	U	6	U	7	U	6	U	6	R	8
sec-Butylbenzene	U	6	U	6	U	7	U	6	U	6	R	8
2-Chlorotoluene	U	6	U	6	U	7	U	6	U	6	R	8
4-Chlorotoluene	U	6	U	6	U	7	U	6	U	6	R	8
1,2-Dichlorobenzene	U	6	U	6	U	7	U	6	U	6	R	8
1,3-Dichlorobenzene	U	6	U	6	U	7	U	6	U	6	R	8
1,4-Dichlorobenzene	U	6	U	6	U	7	U	6	U	6	R	8
1,3-Dichloropropane	U	6	U	6	U	7	U	6	U	6	R	8
2,2-Dichloropropane	U	6	U	6	U	7	U	6	U	6	R	8
1,1-Dichloropropene	U	6	U	6	U	7	U	6	U	6	R	8
Hexachlorobutadiene	U	6	U	6	U	7	U	6	U	6	R	8
Isopropylbenzene	U	6	U	6	U	7	U	6	U	6	R	8
p-Isopropyltoluene	U	6	U	6	U	7	U	6	U	6	R	8
Naphthalene	U	6	U	6	U	7	U	6	U	6	R	8
n-Propylbenzene	U	6	U	6	U	7	U	6	U	6	R	8
1,2,3-Trichlorobenzene	U	6	U	6	U	7	U	6	U	6	R	8
1,2,4-Trichlorobenzene	U	6	U	6	U	7	U	6	U	6	R	8
1,2,4-Trimethylbenzene	U	6	U	6	U	7	U	6	U	6	R	8
1,3,5-Trimethylbenzene	U	6	U	6	U	7	U	6	U	6	R	8
Methyl-tert-Butyl Ether	U	6	U	6	U	7	U	6	U	6	R	8

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
R denotes data is unusable

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Table 19. Results of the Analysis for Pesticides/PCBs in Soil
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID Location % Solid	00504 PCB Spill Area 77		00505 Treatment Plant 79		00506 Fly Ash Pile 60		00501 Reference 85		00502 Wetland Area 80		00503 Emergency Pond 72	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
a-BHC	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
g-BHC	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
b-BHC	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Heptachlor	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
d-BHC	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Aldrin	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Heptachlor Epoxide	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
g-Chlordane	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
a-Chlordane	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Endosulfan (I)	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
p,p'-D D E	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Dieldrin	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Endrin	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
p,p'-D D D	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Endosulfan (II)	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
p,p'-D D T	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Endrin Aldehyde	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Endosulfan Sulfate	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Methoxychlor	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Endrin Ketone	U	4.30	U	4.20	U	5.60	U	3.90	U	4.20	U	4.50
Toxaphene	U	110.0	U	100.0	U	140.0	U	97.0	U	100.0	U	110.0
Aroclor 1016	U	53.0	U	52.0	U	70.0	U	49.0	U	52.0	U	57.0
Aroclor 1221	U	110.0	U	100.0	U	140.0	U	97.0	U	100.0	U	110.0
Aroclor 1232	U	53.0	U	52.0	U	70.0	U	49.0	U	52.0	U	57.0
Aroclor 1242	U	53.0	U	52.0	U	70.0	U	49.0	U	52.0	U	57.0
Aroclor 1248	84	53.0	U	52.0	U	70.0	U	49.0	U	52.0	U	57.0
Aroclor 1254	340	53.0	U	52.0	U	70.0	U	49.0	U	52.0	U	57.0
Aroclor 1260	U	53.0	U	52.0	U	70.0	U	49.0	U	52.0	U	57.0

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 20. Results of Base Neutral/Acid Extractable Analysis of Soils
Avtex Fibers Site
Front Royal, VA
February 1999

Sample No.	00505		00506		00502		00503		00504		00501	
Location	Treatment Plant Area		Fly Ash Pile		Wetland Area		Emergency Pond		PCB Spill Area		Reference Area	
% Solids	79		60		80		72		77		85	
	CONC. ug/kg	MDL ug/kg	CONC. ug/kg	MDL ug/kg	CONC. ug/kg	MDL ug/kg	CONC. ug/kg	MDL ug/kg	CONC. ug/kg	MDL ug/kg	CONC. ug/kg	MDL
Phenol	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
bis(-2-Chloroethyl)Ether	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2-Chlorophenol	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
1,3-Dichlorobenzene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
1,4-Dichlorobenzene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Benzyl alcohol	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
1,2-Dichlorobenzene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2-Methylphenol	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
bis(2-Chloroisopropyl)ether	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
4-Methylphenol	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
N-Nitroso-Di-n-propylamine	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Hexachloroethane	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Nitrobenzene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Isophorone	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2-Nitrophenol	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2,4-Dimethylphenol	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
bis(2-Chloroethoxy)methane	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2,4-Dichlorophenol	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
1,2,4-Trichlorobenzene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Naphthalene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
4-Chloroaniline	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Hexachlorobutadiene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
4-Chloro-3-methylphenol	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2-Methylnaphthalene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Hexachlorocyclopentadiene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2,4,6-Trichlorophenol	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2,4,5-Trichlorophenol	U	11000	R	14000	U	11000	U	12000	U	11000	U	9500
2-Chloronaphthalene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2-Nitroaniline	U	11000	R	14000	U	11000	U	12000	U	11000	U	9500
Dimethylphthalate	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Acenaphthylene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
3-Nitroaniline	U	11000	R	14000	U	11000	U	12000	U	11000	U	9500
Acenaphthene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2,4-Dinitrophenol	U	11000	R	14000	U	11000	U	12000	U	11000	U	9500
4-Nitrophenol	U	11000	R	14000	U	11000	U	12000	U	11000	U	9500
Dibenzofuran	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2,6-Dinitrotoluene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
2,4-Dinitrotoluene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Diethylphthalate	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
4-Chlorophenyl-phenylether	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Fluorene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
4-Nitroaniline	U	11000	R	14000	U	11000	U	12000	U	11000	U	9500
4,6-Dinitro-2-methylphenol	U	11000	R	14000	U	11000	U	12000	U	11000	U	9500
N-Nitrosodiphenylamine	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
4-Bromophenyl-phenylether	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Hexachlorobenzene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Pentachlorophenol	U	11000	R	14000	U	11000	U	12000	U	11000	U	9500
Phenanthrene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Anthracene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Carbazole	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Di-n-butylphthalate	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Fluoranthene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Pyrene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Butylbenzylphthalate	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
3,3'-Dichlorobenzidine	U	11000	R	14000	U	11000	U	12000	U	11000	U	9500
Benzo(a)anthracene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Bis(2-Ethylhexyl)phthalate	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Chrysene	U	2100	R	2800	U	2000	U	2300	1200(J)	2200	U	1900
Di-n-octylphthalate	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Benzo(b)fluoranthene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Benzo(k)fluoranthene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Benzo(a)pyrene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Indeno(1,2,3-cd)pyrene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Dibenzo(a,h)anthracene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900
Benzo(g,h,i)perylene	U	2100	R	2800	U	2000	U	2300	U	2200	U	1900

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
R denotes data is unusable

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Table 21. Results of the Grain Size Analysis, Total Organic Carbon, and Percent Moisture of Soil
Avtex Fibers Site
Front Royal, VA
February 1999

Description	Sample ID Location Particle Size (%)	501 Reference	502 Wetland Area	503 Emergency Pond (Soil)	504 PCB Spill Area	505 Treatment Plant	506 Fly Ash Pile
Gravel	4.75 - 76.2 mm	3.8	2	0	2.2	3.7	13.6
Sand	0.075 - 4.74 mm	70.3	43.8	87.2	59.5	56.7	34.6
Silt	0.005 - 0.074 mm	11.9	18.5	10.3	14.1	24.8	41.1
Clay	0.001 - 0.004 mm	4.6	10	1.2	10	7.7	8
Colloids	< 0.001 mm	9.4	25.7	1.3	14.2	7	2.7
Percent Moisture		14.6	19.5	71.1	20.8	20.5	38.6
Percent Organic Matter		6.8	3.8	17.1	4.7	8.1	29.4

Table 22. Survival and Reproduction of *Pimephales promelas* During
a 7-day Exposure to Surface Water
Avtex Fibers Site
Front Royal, VA
February 1999

Sample ID	Location	Dilution	Percent Survival	Mean Weight per Organism (mg)
Control	NA	100	98	0.044
601	Sulfate Basin No. 1	100	100	0.48
		50	98	0.47
602	Emergency Pond	100	98	0.53
		50	96	0.52
603	Polishing Pond	100	67*	0.43
		50	49*	0.43
046	Sulfate Basin No. 5	100	98	0.48
		50	98	0.48
047	Fly Ash Basin No. 6	100	62*	0.47
		50	96	0.48

Forty-five organisms exposed per concentration
* denotes significantly different (p=0.05) from the control

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Table 23. Survival and Reproduction of *Ceriodaphnia dubia* During
a 7-day Exposure to Surface Water
Avtex Fibers Site
Front Royal, VA
February 1999

Sample ID	Location	Dilution	Percent Survival	Mean No. of Neonates
Control	NA	100	100	16.2
601	Sulfate Basin No. 1	100	100	26.2
		50	100	20.9
602	Emergency Pond	100	90	24.7
		50	100	20.8
603	Polishing Pond	100	90	15.7
		50	100	21.8
046	Sulfate Basin No. 5	100	90	21.3
		50	100	24.5
047	Fly Ash Basin No. 6	100	100	26.7
		50	100	27.7

Ten organisms exposed per chamber
Average number of young per surviving female

Table 24. Survival and Growth of *Hyalella azteca* and *Chironomus tentans* Exposed to River Sediment
Avtex Fibers Site
Front Royal, VA
February 1999

Sample ID	Location	Rep	*Hyalella azteca* No. Alive (% Survival)	*Hyalella azteca* Average Growth Length (mm)	*Hyalella azteca* Average Growth Dry Weight (mg)	*Chironomus tentans* No. Alive (% Survival)	*Chironomus tentans* Mean Dry Weight (mg)
Control	Lab Control	A	5 *	3.1	0.18	9	0.83
		B	10	3	0.18	9	0.62
		C	10	3	0.19	7	0.54
		D	9	3	0.2	7	0.59
		E	10	3	0.2	8	0.76
		F	10	3	0.19	8	0.55
		G	10	3.1	0.16	8	0.56
		H	10	2.8	0.18	10	0.51
		Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
410	Reference No. 2	A	10	3	0.13	6	1.67
		B	10	3	0.19	8	0.99
		C	10	3	0.18	8	0.96
		D	10	2.9	0.12	4	1.25
		E	10	3	0.17	8	0.86
		F	10	3	0.17	8	0.85
		G	10	3	0.25	7	1.41
		H	10	3	0.23	8	0.96
		Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
407	BMI-1 (Outfall 01)	A	10	3.1	0.3	7	2.46
		B	10	3.3	0.31	7	1.94
		C	10	3.4	0.28	9	1.76
		D	10	3.4	0.33	6	1.57
		E	9	3.4	0.28	10	1.75
		F	10	3.2	0.31	7	1.73
		G	10	3.1	0.22	10	1.43
		H	10	3.2	0.28	10	1.78
		Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
402	BMI-2 (Outfall 02)	A	10	3.2	0.26	7	1.8
		B	10	3.3	0.18	8	1.45
		C	10	3.4	0.26	10	1.32
		D	10	3.3	0.21	8	1.53
		E	10	3.2	0.21	9	1.34
		F	10	3.1	0.23	7	1.73
		G	9	3.4	0.28	8	1.2
		H	10	3.5	0.36	8	1.84
		Total	79(99)	[illegible]	[illegible]	[illegible]	[illegible]
403	BMI-3 (Outfall 03)	A	9	3	0.14	6	1
		B	10	2.8	0.12	10	1.02
		C	10	3.1	0.21	8	1.18
		D	10	3	0.15	8	1.05
		E	10	3.1	0.23	9	1.08
		F	10	2.9	0.15	8	0.8
		G	10	3.1	0.18	8	0.84
		H	9	3.1	0.19	5	0.86
		Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
404	BMI-4 (Outfall 04)	A	10	3.6	0.3	7	1.86
		B	10	3.4	0.29	9	1.47
		C	10	3.7	0.4	10	1.41
		D	10	3.5	0.31	8	2
		E	10	3.4	0.34	9	1.9
		F	10	3.2	0.35	8	2.11
		G	10	3.5	0.37	10	1.3
		H	10	3.3	0.36	8	1.78
		Total	80(100)	[illegible]	[illegible]	[illegible]	[illegible]
405	BMI-5 (Outfall 05)	A	8	3	0.19	8	0.69
		B	10	3.1	0.19	4	0.9
		C	8	3.2	0.16	5	1.04
		D	10	3.2	0.19	4	0.75
		E	10	3.1	0.2	6	1.18
		F	10	3.2	0.21	8	0.68
		G	10	3.3	0.25	7	0.99
		H	7	3.1	0.23	5	0.84
		Total	73(91)	[illegible]	[illegible]	[illegible]	[illegible]

Ten organisms exposed per replicate
* denotes significantly different (p<0.05) from laboratory control
NM - not measured due to 100 percent mortality

Table 25. Survival and Growth of *Hyalella azteca* and *Chironomus tentans* Exposed to On-Site Sediment
Avtex Fibers Site
Front Royal, VA
February 1999

			Hyalella azteca			*Chironomus tentans*	
			No. Alive	Average Growth		No. Alive	Mean
Sample ID	Location	Rep	(% Survival)	Length (mm)	Dry Weight (mg)	(% Survival)	Dry Weight (mg)
Control	Lab Control	A	5	3.1	0.18	9	0.83
		B	10	3	0.18	9	0.62
		C	10	3	0.19	7	0.54
		D	9	3	0.2	7	0.59
		E	10	3	0.2	8	0.76
		F	10	3	0.19	8	0.55
		G	10	3.1	0.16	8	0.56
		H	10	2.8	0.18	10	0.51
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
044	Sulfate Basin No. 5	A	0	NM	NM	0	NM
		B	0	NM	NM	2	0.3
		C	0	NM	NM	1	0.2
		D	0	NM	NM	3	0.2
		E	0	NM	NM	5	0.16
		F	0	NM	NM	2	0.25
		G	0	NM	NM	1	0.2
		H	0	NM	NM	1	0.3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
045	Fly Ash Basin No.6	A	7	3.1	0.21	4	0.18
		B	10	3	0.15	6	0.3
		C	10	3.1	0.17	6	0.15
		D	10	3	0.19	7	0.3
		E	8	2.9	0.14	4	0.33
		F	10	36	0.18	6	0.28
		G	8	3.1	0.18	8	0.35
		H	7	3.1	0.14	6	0.32
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
605	Sulfate Basin No. 1	A	8	3.2	0.18	9	0.84
		B	10	3.2	0.19	7	1.3
		C	10	3.3	0.23	10	0.89
		D	10	3.1	0.22	6	0.98
		E	10	3	0.2	9	1.24
		F	10	3.3	0.23	8	1.06
		G	10	3.3	0.2	10	0.93
		H	10	3.4	0.29	5	1.28
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
606	Emergency Pond	A	5	2.7	0.1	1	0.5
		B	9	2.4	0.11	1	0.3
		C	2	2.7	0.1	0	NM
		D	6	2.6	0.17	2	0.25
		E	5	2.9	0.12	0	NM
		F	10	2.7	0.15	4	0.33
		G	1	2.4	0.2	0	NM
		H	4	2.6	0.15	0	NM
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
607	Polishing Pond	A	10	3.1	0.23	5	1.62
		B	10	3	0.19	8	1.06
		C	10	2.9	0.12	6	1.4
		D	9	3	0.13	5	1.54
		E	10	3	0.19	6	1.1
		F	9	3	0.19	5	1.32
		G	8	3.1	0.21	5	1.5
		H	7	3	0.19	6	1.35
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
608	Viscose Creek	A	4	2.8	0.1	7	1.14
		B	4	3.2	0.2	9	1.26
		C	7	3.1	0.14	9	1.09
		D	5	2.6	0.12	9	0.83
		E	6	3	0.18	8	1.19
		F	5	2.7	0.14	9	1.37
		G	1	2.5	0.1	7	1.04
		H	3	3.1	0.2	10	1.29
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Ten organisms exposed per replicate
* denotes significantly different (p<0.05) from laboratory control
NM - not measured due to 100 percent mortality

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Table 26. Survival and Growth of Earthworms Exposed to Soil
Avtex Fibers Site
Front Royal, VA
February 1999

Sample ID	Location	REP	Survival (Percent)				Initial Weight	Final Weight	Growth (%)
			7-Day	14-Day	21-Day	28-Day			
	Control No. 1	A	70	70	70	69	28.4	39.3	38.5
		B	70	70	70	70	25.8	34.9	35.1
		C	70	70	70	70	26.1	37.9	45.2
		Total/Mean	210(100)	210(100)	210(100)	209(100)	[illegible]	[illegible]	[illegible]
	Control No. 2	A	70	70	70	69	24.2	36.4	50.4
		B	70	70	70	70	23.7	32.3	36.3
		C	70	70	70	70	26.8	236.6	36.6
		Total/Mean	210(100)	210(100)	210(100)	210(100)	[illegible]	[illegible]	[illegible]
501	Reference	A	70	68	68	50	23.1	20.3	-12.1
		B	70	70	70	55	24.3	28.3	16.4
		C	70	70	70	65	25.5	26.1	2.2
		Total/Mean	210(100)	208(99)	208(99)	[illegible]	[illegible]	[illegible]	[illegible]
502	Wetland Area	A	70	70	70	70	23.6	28.2	19.5
		B	70	70	70	70	23.3	26.1	12.3
		C	70	70	70	70	24.5	30.4	24.2
		Total/Mean	210(100)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
503	Emergency Pond	A	70	70	70	70	23.3	32.0	37.7
		B	70	70	70	70	27.5	25.7	-6.5
		C	70	70	70	70	25.8	24.9	-3.4
		Total/Mean	210(100)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
504	PCB Spill Area	A	70	70	70	70	27.5	24.5	-10.9
		B	70	70	70	70	27.0	25.8	-4.4
		C	70	70	70	70	22.0	22.6	2.7
		Total/Mean	210(100)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
505	Treatment Plant	A	70	70	70	70	24.3	37.0	52.3
		B	70	70	70	70	23.6	32.9	39.4
		C	70	70	70	70	-24.4	33.6	37.7
		Total/Mean	210(100)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
506	Fly Ash Pile	A	70	70	70	59	25.7	18.0	-29.8
		B	70	70	70	64	28.9	20.8	-27.9
		C	70	70	70	69	27.0	26.4	-2.1
		Total/Mean	210(100)	210(100)	210(100)	[illegible]	[illegible]	[illegible]	[illegible]

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Table 27 Results of the Metals Analysis in Earthworms
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	Method Blank		CO2 Blank		Lab Control 1A		Lab Control 1B		Lab Control 1C		Lab Control 2A		Lab Control 2B		Lab Control 2C	
Location	Lab		Lab		Earthworm tissue		Earthworm tissue		Earthworm tissue		Earthworm tissue		Earthworm tissue		Earthworm tissue	
% Solids	NA		NA		11		11		14		12		10		9	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/sample	MDL mg/sample	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	5.0	0.0073	0.0025	300	53	470	50	270	37	190	43	240	49	720	56
Antimony	U	0.20	U	0.0001	U	2.1	U	2.0	U	1.5	U	1.7	U	2.0	U	2.3
Arsenic	U	0.20	U	0.0001	2.4	2.1	U	2.0	1.9	1.5	3.6	1.7	U	2.0	2.8	2.3
Barium	U	0.30	0.0005	0.00015	U	3.2	4.0	3.0	U	2.2	U	2.6	3.1	3.0	4.9	3.4
Beryllium	U	0.20	U	0.0001	U	2.1	U	2.0	U	1.5	U	1.7	U	2.0	U	2.3
Cadmium	U	0.30	U	0.00015	U	3.2	U	3.0	U	2.2	U	2.6	U	3.0	U	3.4
Calcium	U	10	0.037	0.005	3700	110	3900	99	3900	74	3500	87	3500	98	3900	110
Chromium	U	0.50	U	0.00025	U	5.3	U	5.0	U	3.7	U	4.3	U	4.9	U	5.6
Cobalt	U	0.50	U	0.00025	U	5.3	5.6	5.0	4.5	3.7	5.3	4.3	7.4	4.9	6.5	5.6
Copper	U	0.50	0.0053	0.00025	12	5.3	14	5.0	11	3.7	11	4.3	12	4.9	29	5.6
Iron	U	2.5	0.015	0.0013	240	26	280	25	280	19	270	22	290	25	310	28
Lead	U	0.20	0.00024	0.0001	U	2.1	U	2.0	3.3	1.5	U	1.7	U	2.0	U	2.3
Magnesium	U	50	U	0.025	880	530	940	500	960	370	920	430	950	490	940	560
Manganese	U	0.20	0.00026	0.0001	15	2.1	18	2.0	18	1.5	20	1.7	17	2.0	16	2.3
Mercury	U	0.04	U	0.00002	U	0.42	U	0.40	U	0.28	U	0.35	U	0.42	U	0.49
Nickel	U	1.0	0.0012	0.0005	U	11	U	9.9	U	7.4	U	8.7	U	9.8	U	11
Potassium	U	200	U	0.1	8800	2100	7900	2000	8900	1500	8800	1700	9600	2000	8800	2300
Selenium	U	0.20	U	0.0001	3.4	2.1	3.3	2.0	3.2	1.5	3.2	1.7	3.6	2.0	2.8	2.3
Silver	U	0.50	U	0.00025	U	5.3	U	5.0	U	3.7	U	4.3	U	4.9	U	5.6
Sodium	U	50	0.031	0.025	5500	530	5200	500	5500	370	5300	430	5300	490	5300	560
Thallium	U	0.20	U	0.0001	U	2.1	U	2.0	U	1.5	U	1.7	U	2.0	U	2.3
Vanadium	U	0.50	U	0.00025	U	5.3	U	5.0	U	3.7	U	4.3	U	4.9	U	5.6
Zinc	0.70	0.50	0.004	0.00025	120	5.3	130	5.0	130	3.7	110	4.3	130	4.9	110	5.6

MDL denotes Method Detection Limit
U denotes less than the MDL

Table 27 (Cont'd) Results of the Metals Analysis in Earthworms
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00501A		00501B		00501C		00502A		00502B		00502C		00503A		00503B		00503C	
Location	Reference Area		Reference Area		Reference Area		Wetland Area		Wetland Area		Wetland Area		Emergency Pond		Emergency Pond		Emergency Pond	
% Solids	11		11		13		9		9		10		14		13		13	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	100	49	190	50	160	41	1600	54	1100	61	1300	53	150	38	120	38	230	42
Antimony	U	2.0	U	2.0	U	1.7	U	2.2	U	2.5	U	2.1	U	1.5	U	1.5	U	1.7
Arsenic	2.6	2.0	2.7	2.0	2.6	1.7	3.4	2.2	3.7	2.5	5.9	2.1	2.6	1.5	2.3	1.5	2.8	1.7
Barium	6.2	3.0	5.0	3.0	4.6	2.5	15	3.3	12	3.7	11	3.2	2.7	2.3	2.7	2.3	3.3	2.5
Beryllium	U	2.0	U	2.0	U	1.7	U	2.2	U	2.4	U	2.1	U	1.5	U	1.5	U	1.7
Cadmium	U	3.0	U	3.0	U	2.5	U	3.3	U	3.7	U	3.2	U	2.3	U	2.3	U	2.5
Calcium	4500	99	4300	100	4500	83	4600	110	5200	120	4300	110	3700	76	4800	76	3900	83
Chromium	U	4.9	U	5.0	U	4.1	U	5.4	U	6.1	U	5.3	U	3.8	U	3.8	U	4.2
Cobalt	5.4	4.9	6.4	5.0	6.7	4.1	9.3	5.4	11	6.1	9.8	5.3	5.5	3.8	8.3	3.8	5.2	4.2
Copper	12	4.9	13	5.0	17	4.1	26	5.4	17	6.1	24	5.3	11	3.8	15	3.8	12	4.2
Iron	360	25	500	25	440	21	2600	27	1900	31	2500	26	650	19	590	19	770	21
Lead	U	2.0	U	2.0	U	1.7	U	2.2	U	2.5	2.6	2.1	U	1.5	U	1.5	U	1.7
Magnesium	820	490	910	500	830	410	900	540	920	610	870	530	1200	380	1600	380	1000	420
Manganese	15	2.0	14	2.0	14	1.7	21	2.2	17	2.4	19	2.1	94	1.5	140	1.5	110	1.7
Mercury	U	0.41	U	0.42	U	0.28	U	0.45	U	0.5	U	0.43	U	0.31	U	0.32	U	0.32
Nickel	U	9.9	U	10	U	8.3	U	11	U	12	U	11	U	7.6	U	7.6	U	8.3
Potassium	8200	2000	9000	2000	9500	1700	8700	2200	9400	2400	8400	2100	7800	1500	9200	1500	8200	1700
Selenium	5.4	2.0	4.7	2.0	3.7	1.7	4.0	2.2	4.8	2.5	3.6	2.1	3.8	1.5	3.7	1.5	3.7	1.7
Silver	U	4.9	U	5.0	U	4.1	U	5.4	U	6.1	U	5.3	U	3.8	U	3.8	U	4.2
Sodium	4200	490	4800	500	5200	410	4700	540	5000	610	4600	530	5600	380	6500	380	5400	420
Thallium	U	2.0	U	2.0	U	1.7	U	2.2	U	2.5	U	2.1	U	1.5	U	1.5	U	1.7
Vanadium	U	4.9	U	5.0	U	4.1	U	5.4	U	6.1	U	5.3	U	3.8	U	3.8	U	4.2
Zinc	130	4.9	120	5.0	110	4.1	120	5.4	120	6.1	110	5.3	110	3.8	160	3.8	120	4.2

MDL denotes Method Detection Limit
U denotes less than the MDL

Table 27 (Cont'd) Results of the Metals Analysis in Earthworms
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00504A		00504B		00504C		00505A		00505B		00505C		00506A		00506B		00506C	
Location	PCB Spill Area		PCB Spill Area		PCB Spill Area		Treatment Plant		Treatment Plant		Treatment Plant		Fly Ash Pile		Fly Ash Pile		Fly Ash Pile	
% Solids	11		10		9		12		11		10		11		13		14	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	160	44	280	55	140	55	880	44	470	47	550	49	700	53	670	44	590	37
Antimony	U	1.7	U	2.2	U	2.2	U	1.8	U	1.9	U	2.0	U	2.1	U	1.8	U	1.5
Arsenic	3	1.7	3.0	2.2	2.7	2.2	7.4	1.8	2.8	1.9	2.0	2.0	26	2.1	22	1.8	23	1.5
Barium	U	2.6	U	3.3	U	3.3	10	2.6	7.8	2.8	7.6	2.9	62	3.2	79	2.6	62	2.2
Beryllium	U	1.7	U	2.2	U	2.2	U	1.7	U	1.9	U	2.0	U	2.1	U	1.7	U	1.5
Cadmium	U	2.6	U	3.3	U	3.3	U	2.6	U	2.8	U	2.9	U	3.2	U	2.6	U	2.2
Calcium	5200	87	5700	110	5500	110	4300	87	3600	94	3700	98	3800	110	3800	87	3500	73
Chromium	U	4.4	U	5.5	U	5.5	U	4.4	U	4.7	6.5	4.9	U	5.3	U	4.4	U	3.7
Cobalt	5.4	4.4	6.4	5.5	U	5.5	9.7	4.4	5.8	4.7	U	4.9	6.2	5.3	5.8	4.4	4.8	3.7
Copper	14	4.4	15	5.5	12	5.5	18	4.4	32	4.7	26	4.9	14	5.3	15	4.4	12	3.7
Iron	400	22	510	28	400	28	1300	22	870	24	720	24	1700	27	1300	22	1300	18
Lead	U	1.7	U	2.2	U	2.2	U	1.8	U	1.9	U	2.0	2.2	2.1	U	1.8	U	1.5
Magnesium	880	440	880	550	890	550	1100	440	920	470	960	490	950	530	930	440	930	370
Manganese	10	1.7	15	2.2	8.4	2.2	67	1.7	58	1.9	47	2.0	15	2.1	13	1.7	18	1.5
Mercury	U	0.35	U	0.42	U	0.47	U	0.33	U	0.35	U	0.41	U	0.4	U	0.35	0.31	0.31
Nickel	U	8.7	U	11	U	11	U	8.7	U	9.4	U	9.8	U	11	U	8.7	U	7.3
Potassium	8500	1700	8000	2200	7400	2200	9600	1700	8400	1900	8700	2000	9100	2100	9300	1700	9700	1500
Selenium	3.7	1.7	4.2	2.2	3.6	2.2	4.7	1.8	3.7	1.9	4.1	2.0	8.1	2.1	8.3	1.8	8.4	1.5
Silver	U	4.4	U	5.5	U	5.5	U	4.4	U	4.7	U	4.9	U	5.3	U	4.4	U	3.7
Sodium	5700	440	5500	550	6000	550	5300	440	4800	470	5200	490	4500	530	4400	440	4600	370
Thallium	U	1.7	U	2.2	U	2.2	U	1.8	U	1.9	U	2.0	U	2.1	U	1.8	U	1.5
Vanadium	U	4.4	U	5.5	U	5.5	U	4.4	U	4.7	U	4.9	U	5.3	U	4.4	4.4	3.7
Zinc	120	4.4	180	5.5	120	5.5	170	4.4	150	4.7	150	4.9	130	5.3	140	4.4	130	3.7

MDL denotes Method Detection Limit
U denotes less than the MDL

Table 28 Summary of Results of the Analysis of Metals and PCBs in Earthworms
Avtex Fibers Site
Front Royal, VA
February 1999

Location Solids		Reference 12		Wetland Area 9		Emergency Pond 13		PCB Spill Area 10		Treatment Plant 12		Fly Ash Pile 10	
Parameter		Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg
Arsenic	Mean	2.6	0.31	4.3	0.39	2.6	0.34	2.9	0.29	4.1	0.49	24	2.4
	Max	2.7	0.32	5.9	0.53	2.8	0.36	3	0.3	7.4	0.89	26	2.6
Cadmium	Mean	*1.4*	*0.17*	*1.7*	*0.15*	*1.2*	*0.16*	*1.5*	*0.15*	*1.4*	*0.17*	*1.3*	*0.13*
	Max	*1.5*	*0.18*	*1.9*	*0.17*	*1.3*	*0.17*	*1.7*	*0.17*	*1.5*	*0.18*	*1.6*	*0.16*
Chromium	Mean	*2.3*	*0.28*	*2.8*	*0.25*	*2.0*	*0.26*	*2.6*	*0.26*	3.7	0.44	*2.2*	*0.22*
	Max	*2.5*	*0.3*	*3.1*	*0.28*	*2.1*	*0.27*	*2.8*	*0.28*	6.5	0.78	*2.7*	*0.27*
Copper	Mean	14	1.7	22	2	13	1.7	14	1.4	25	3	14	1.4
	Max	17	2	26	2.3	15	2	15	1.5	32	3.8	15	1.5
Lead	Mean	*0.95*	*0.11*	1.7	0.15	*0.78*	*0.10*	*1.0*	*0.10*	*0.95*	*0.11*	*1.3*	*0.130*
	Max	*1*	*0.12*	2.6	0.23	*0.85*	*0.11*	*1.0*	*0.10*	*1*	*0.12*	*2.2*	*0.22*
Mercury	Mean	*0.19*	*0.023*	*0.23*	*0.021*	*0.16*	*0.021*	*0.21*	*0.021*	*0.18*	*0.022*	*0.23*	*0.023*
	Max	*0.21*	*0.025*	*0.25*	*0.023*	*0.16*	*0.021*	*0.24*	*0.024*	*0.21*	*0.025*	*0.31*	*0.031*
Nickel	Mean	*4.7*	*0.56*	*5.7*	*0.51*	*3.9*	*0.51*	*5.1*	*0.51*	*4.7*	*0.57*	*4.5*	*0.45*
	Max	*5*	*0.6*	*6*	*0.54*	*4.2*	*0.55*	*5.5*	*0.55*	*4.9*	*0.59*	*5.5*	*0.55*
Zinc	Mean	120	14	120	11	130	17	140	14	160	19	130	13
	Max	130	16	120	11	160	21	180	18	170	20	140	14
PCBs	Mean	0.036	0.0043	0.041	0.0037	0.15	0.020	2.5	0.25	0.10	0.012	0.031	0.0031
	Max	0.048	0.0058	0.042	0.0038	0.19	0.025	2.9	0.29	0.10	0.012	0.034	0.0034

Values in italics were not detected
mg/kg - milligram per kilogram
PCBs - Total of Aroclor 1254 and 1260

Table 29 Results of the Analysis for PCBs in Earthworms
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	Lab Control 1a		Lab Control 1b		Lab Control 1c		Lab Control 2a		Lab Control 2b		Lab Control 2c		00501a		00501b		00501c	
Location	NA		NA		NA		NA		NA		NA		Reference		Reference		Reference	
Percent Solid	11		11		14		12		10		9		11		13		13	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
Aroclor 1016	U	200	U	180	U	140	U	160	U	190	U	210	U	240	U	150	U	150
Aroclor 1221	U	400	U	350	U	270	U	330	U	380	U	430	U	470	U	310	U	290
Aroclor 1232	U	200	U	180	U	140	U	160	U	190	U	210	U	240	U	150	U	150
Aroclor 1242	U	200	U	180	U	140	U	160	U	190	U	210	U	240	U	150	U	150
Aroclor 1248	61WJ	200	340WJ	180	320WJ	140	250WJ	160	200WJ	190	350WJ	210	210WJ	240	200WJ	150	160WJ	150
Aroclor 1254	U	200	U	180	U	140	U	160	U	190	U	210	U	240	U	150	U	150
Aroclor 1260	U	200	U	180	U	140	U	160	U	190	U	210	U	240	U	150	U	150

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 29 (Cont'd) Results of the Analysis for PCBs in Earthworms
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00502a		00502b		00502c		00503a		00503b		00503c		00504a		00504b		00504c	
Location	Wetland Area		Wetland Area		Wetland Area		Emergency Pond		Emergency Pond		Emergency Pond		PCB Spill Area		PCB Spill Area		PCB Spill Area	
Percent Solid	9		9		10		14		13		13		11		10		9	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
Aroclor 1016	U	210	U	210	U	190	U	140	U	150	U	150	U	180	U	190	U	220
Aroclor 1221	U	420	U	430	U	380	U	280	U	310	U	290	U	350	U	390	U	430
Aroclor 1232	U	210	U	210	U	190	U	140	U	150	U	150	U	180	U	190	U	220
Aroclor 1242	U	210	U	210	U	190	U	140	U	150	U	150	U	180	U	190	U	220
Aroclor 1248	240WJ	210	290WJ	210	230WJ	190	390WJ	140	360WJ	150	276WJ	150	540WJ	180	500WJ	190	510WJ	220
Aroclor 1254	U	210	U	210	U	190	46WJ	140	61WJ	150	81WJ	150	2800WJ	180	2400WJ	190	2200WJ	220
Aroclor 1260	U	210	U	210	U	190	64WJ	140	94WJ	150	104WJ	150	81WJ	180	59WJ	190	54WJ	220

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 29 (Cont'd) Results of the Analysis for PCBs in Earthworms
Avtex Fibers Site
Front Royal, VA
March 1998

Client ID Location Percent Solid	00505a Treatment Plant 11		00505b Treatment Plant 11		00505c Treatment Plant 14		00506a Fly Ash Pile 12		00506b Fly Ash Pile 10		00506c Fly Ash Pile 9		MBLK 062697 Blank 100		MBLK 062797 Blank 100	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
Aroclor 1016	U	170	U	180	U	200	U	170	U	150	U	140	U	20	U	20
Aroclor 1221	U	330	U	360	U	390	U	340	U	310	U	270	U	40	U	40
Aroclor 1232	U	170	U	180	U	200	U	170	U	150	U	140	U	20	U	20
Aroclor 1242	U	170	U	180	U	200	U	170	U	150	U	140	U	20	U	20
Aroclor 1248	200WJ	170	220WJ	180	200WJ	200	61WJ	170	110WJ	150	110WJ	140	U	20	U	20
Aroclor 1254	45WJ	170	47WJ	180	37WJ	200	U	170	U	150	U	140	U	20	U	20
Aroclor 1260	64WJ	170	53WJ	180	62WJ	200	U	170	U	150	U	140	U	20	U	20

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 30. Results of the Analysis for Pesticides/PCBs in Fingernail Clam
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00130		00131		00132		00133		00134		00135		00136		00137		00138		00139		00140	
Location	Reference No.2		Reference No. 2		Outfall 01 (BMI-1)		Outfall 01 (BMI-1)		Outfall 02 (BMI-2)		Outfall 02 (BMI-2)		Outfall 03 (BMI-3)		Outfall 03 (BMI-3)		Outfall 04 (BMI-4)		Outfall 05 (BMI-5)		Outfall 05 (BMI-5)	
Percent Solid	15		16		18		17		20		21		22		21		21		24		23	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
a-BHC	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
g-BHC	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
b-BHC	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
Heptachlor	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
d-BHC	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
Aldrin	U	26	U	25	4.6	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
Heptachlor Epoxide	13	26	U	25	9.3	21	8.9	24	11	19	7.8	19	7.8	18	8.1	19	U	18	8.8	17	8.2	17
g-Chlordane	U	26	U	25	U	21	U	24	U	19	U	19	15	18	U	19	U	18	U	17	U	17
a-Chlordane	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
Endosulfan (I)	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
p,p'-D D E	U	26	6	25	U	21	U	24	U	19	U	19	U	18	U	19	63	18	U	17	U	17
Dieldrin	U	26	3	25	4.2	21	3.9	24	3.8	19	U	19	U	18	U	19	U	18	U	17	U	17
Endrin	U	26	U	25	U	21	U	24	U	19	U	19	47	18	U	19	U	18	U	17	U	17
p,p'-D D D	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
Endosulfan (II)	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
p,p'-D D T	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
Endrin Aldehyde	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
Endosulfan Sulfate	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
Methoxychlor	4.9	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
Endrin Ketone	U	26	U	25	U	21	U	24	U	19	U	19	U	18	U	19	U	18	U	17	U	17
Toxaphene	U	260	U	250	U	210	U	240	U	190	U	190	U	180	U	190	U	180	U	170	U	170
Aroclor 1016	U	130	U	120	U	110	U	120	U	96	U	93	U	90	U	95	U	90	U	83	U	85
Aroclor 1221	U	260	U	250	U	210	U	240	U	190	U	190	U	180	U	190	U	180	U	170	U	170
Aroclor 1232	U	130	U	120	U	110	U	120	U	96	U	93	U	90	U	95	U	90	U	83	U	85
Aroclor 1242	U	130	U	120	U	110	U	120	U	96	U	93	U	90	U	95	U	90	U	83	U	85
Aroclor 1248	U	130	U	120	U	110	U	120	U	96	U	93	U	90	U	95	U	90	U	83	U	85
Aroclor 1254	190 W	130	70 W	120	82 W	110	70 W	120	78 W	96	76 W	93	81 W	90	64 W	95	2300 W	90	62 W	83	64 W	85
Aroclor 1260	U	130	U	120	U	110	U	120	31 W	96	U	93	64 W	90	47 W	95	510 W	90	27 W	83	U	85

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

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Table 31 Summary of Results of the Analysis of Metals and PCBs in Clams
Avtex Fibers Site
Front Royal, VA
February 1999

Location		Reference No 2		Outfall 001 (BMI-1)		Outfall 002 (BMI-2)		Outfall 003 (BMI-3)		Outfall 004 (BMI-4)		Outfall 005 (BMI-5)	
Solids		16		18		20		22		21		24	
Parameter		Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg
Arsenic	Mean	3.2	0.51	3.5	0.63	3.4	0.68	2.3	0.51	3.1	0.65	3.2	0.77
	Max	3.4	0.54	3.6	0.65	3.4	0.68	2.8	0.62	3.1	0.65	3.3	0.79
Cadmium	Mean	*0.6*	*0.096*	*0.5**	*0.10*	*0.45*	*0.09*	*0.45*	*0.10*	*0.55*	*0.12*	*0.46*	*0.11*
	Max	*0.6*	*0.096*	*0.65*	*0.12*	*0.45*	*0.09*	*0.48*	*0.11*	*0.55*	*0.12*	*0.55*	*0.13*
Chromium	Mean	2.7	0.43	1.4	0.25	1.4	0.28	0.8	0.18	2.7	0.57	3.2	0.77
	Max	2.9	0.46	1.7	0.31	2.0	0.40	0.8	0.18	2.7	0.57	4.7	1.1
Copper	Mean	37	5.9	35	6.3	38	7.6	22	4.8	25	5.3	33	7.9
	Max	44	7.0	35	6.3	43	8.6	27	5.9	25	5.3	38	9.1
Lead	Mean	0.85	0.14	*0.39*	*0.07*	0.45	0.09	0.51	0.11	*0.38*	*0.08*	*0.3*	*0.072*
	Max	0.92	0.15	*0.45*	*0.081*	0.6	0.12	0.73	0.16	*0.38*	*0.08*	*0.35*	*0.084*
Mercury	Mean	0.93	0.15	0.76	0.14	0.9	0.18	0.54	0.12	0.43	0.09	0.54	0.13
	Max	1.0	0.16	0.79	0.14	0.91	0.18	0.58	0.13	0.43	0.09	0.56	0.13
Nickel	Mean	*2.0*	*0.32*	*1.9*	*0.34*	*1.5*	*0.3*	*1.5*	*0.33*	*1.9*	*0.4*	*1.5*	*0.36*
	Max	*2.0*	*0.32*	*2.2*	*0.4*	*1.5*	*0.3*	*1.6*	*0.35*	*1.9*	*0.4*	*1.8*	*0.43*
Zinc	Mean	160	26	130	23	100	20	90	20	140	29	92	22
	Max	190	30	140	25	100	20	110	24	140	29	94	23
PCBs	Mean	0.14	0.022	0.088	0.016	0.097	0.019	0.13	0.028	2.8	0.59	0.081	0.019
	Max	0.2	0.033	0.093	0.017	0.11	0.022	0.15	0.033	2.8	0.59	0.089	0.021

Values in italics were not detected
mg/kg - milligram per kilogram
PCBs - Total of Aroclor 1254 and 1260

Table 32 Results of the Analysis of Metals in Clams
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	130		131		132		133		134		135		136		137		138		139		140	
Location	*Reference No 2*		*Reference No 2*		Outfall 01 (BMI-1)		Outfall 01 (BMI-1)		Outfall 02 (BMI-2)		Outfall 02 (BMI-2)		Outfall 03 (BMI-3)		Outfall 03 (BMI-3)		Outfall 04 (BMI-4)		Outfall 05 (BMI-5)		Outfall 05 (BMI-5)	
% Solids	15		16		18		18		20		20		22		21		21		24		23	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	470	20	880	20	56	17	120	22	480	15	470	15	110	16	74	14	84	19	74	12	60	18
Antimony	U	0.80	U	0.78	U	0.66	U	0.90	U	0.60	U	0.60	U	0.64	U	0.57	0.76	0.76	U	0.48	U	0.70
Arsenic	2.9	0.80	3.4	0.78	3.4	0.66	3.6	0.90	3.4	0.60	3.3	0.60	2.8	0.64	1.8	0.57	3.1	0.76	3.1	0.48	3.3	0.70
Barium	11	1.2	12	1.2	4.6	0.99	5.4	1.3	8.3	0.90	8.4	0.90	5.2	0.96	3.4	0.85	5.1	1.1	4.2	0.72	4.3	1.1
Beryllium	U	0.80	U	0.78	U	0.66	U	0.90	U	0.60	U	0.60	U	0.64	U	0.57	U	0.76	U	0.48	U	0.70
Cadmium	U	1.2	U	1.2	U	0.99	U	1.3	U	0.90	U	0.90	U	0.96	U	0.85	U	1.1	U	0.72	U	1.1
Calcium	4200	40	3000	39	1700	33	1500	45	5800	30	10000	30	3300	32	1900	28	7600	38	4700	24	4700	35
Chromium	2.5	2.0	2.9	2.0	1.7	1.7	U	2.2	U	1.5	2.0	1.5	U	1.6	U	1.4	2.7	1.9	1.7	1.2	4.7	1.8
Cobalt	U	2.0	U	2.0	U	1.7	U	2.2	U	1.5	U	1.5	U	1.6	U	1.4	U	1.9	U	1.2	U	1.8
Copper	44	2.0	30	2.0	35	1.7	35	2.2	43	1.5	32	1.5	27	1.6	16	1.4	25	1.9	27	1.2	38	1.8
Iron	1100	10	970	9.8	240	8.3	380	11	860	7.5	770	7.5	320	8.0	200	7.1	260	9.5	300	6.0	230	8.8
Lead	0.92	0.80	0.78	0.78	U	0.66	U	0.90	0.60	0.60	U	0.60	0.73	0.64	U	0.57	U	0.76	U	0.48	U	0.70
Magnesium	950	200	690	200	700	170	790	220	*610*	*150*	*590*	*150*	*630*	*160*	*400*	*140*	630	190	600	120	610	180
Manganese	43	0.80	32	0.78	13	0.66	17	0.90	32	0.60	30	0.60	16	0.64	8.3	0.57	13	0.76	9.7	0.48	10	0.70
Mercury	1.0	0.20	0.85	0.19	0.73	0.16	0.79	0.18	0.91	0.15	0.88	0.15	0.58	0.17	0.49	0.14	0.43	0.14	0.56	0.12	0.52	0.15
Nickel	U	4.0	U	3.9	U	3.3	U	4.5	U	3.0	U	3.0	U	3.2	U	2.8	U	3.8	U	2.4	U	3.5
Potassium	*2700*	*800*	*2100*	780	2000	660	2100	900	1800	600	1900	600	2100	640	1300	570	2000	760	2100	480	2100	700
Selenium	1.9	0.80	2.5	0.78	2.6	0.66	2.5	0.90	2.2	0.60	2.0	0.60	2.2	0.64	1.4	0.57	2.4	0.76	2.0	0.5	2.0	0.70
Silver	U	2.0	U	2.0	U	1.7	U	2.2	U	1.5	U	1.5	U	1.6	U	1.4	U	1.9	U	1.2	U	1.8
Sodium	2100	200	1600	200	1800	170	2000	220	920	150	980	150	1200	160	790	140	1500	190	890	120	980	180
Thallium	U	0.80	U	0.78	U	0.66	U	0.90	U	0.60	U	0.60	U	0.64	U	0.57	U	0.76	U	0.48	U	0.70
Vanadium	U	2.0	U	2.0	U	1.7	U	2.2	U	1.5	U	1.5	*U*	*1.6*	*U*	*1.4*	*U*	*1.9*	*U*	*1.2*	*U*	*1.8*
Zinc	190	2.0	130	2.0	120	1.7	140	2.2	100	1.5	100	1.5	110	1.6	70	1.4	140	1.9	90	1.2	94	1.8

MDL denotes Method Detection Limit
U denotes less than the MDL

Table 33 Results of the Analysis for Pesticides/PCBs in Redbreast Sunfish
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00071		00072		00073		00074		00075		00076		00077	
Location	Outfall 001		Outfall 001		Outfall 001		Outfall 001		Outfall 001		Outfall 001		Outfall 001	
Percent Solid	28		29		24		27		25		26		28	
Analyte	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg
a-BHC	U	14	U	14	U	17	U	15	U	16	U	15	U	14
g-BHC	U	14	U	14	U	17	U	15	U	16	U	15	U	14
b-BHC	U	14	U	14	U	17	U	15	U	16	U	15	U	14
Heptachlor	U	14	U	14	U	17	U	15	U	16	U	15	18 J	14
d-BHC	U	14	U	14	U	17	U	15	U	16	U	15	U	14
Aldrin	U	14	U	14	U	17	U	15	U	16	U	15	U	14
Heptachlor Epoxide	U	14	U	14	6.1 J	17	U	15	U	16	U	15	U	14
g-Chlordane	U	14	U	14	U	17	U	15	U	16	U	15	U	14
a-Chlordane	U	14	U	14	U	17	U	15	U	16	U	15	U	14
Endosulfan (I)	U	14	U	14	U	17	U	15	U	16	U	15	U	14
p,p'-D D E	17	14	15	14	22	17	14 J	15	16	16	15	15	18	14
Dieldrin	4.9 J	14	U	14	U	17	U	15	U	16	U	15	3.5 J	14
Endrin	U	14	U	14	U	17	U	15	U	16	U	15	U	14
p,p'-D D D	U	14	U	14	U	17	U	15	U	16	U	15	U	14
Endosulfan (II)	U	14	U	14	U	17	U	15	U	16	U	15	U	14
p,p'-D D T	U	14	U	14	U	17	U	15	U	16	U	15	U	14
Endrin Aldehyde	U	14	U	14	U	17	U	15	U	16	U	15	U	14
Endosulfan Sulfate	U	14	U	14	U	17	U	15	U	16	U	15	U	14
Methoxychlor	U	14	U	14	U	17	U	15	U	16	U	15	U	14
Endrin Ketone	U	14	U	14	U	17	U	15	U	16	U	15	U	14
Toxaphene	U	140	U	140	U	170	U	150	U	160	U	150	U	140
Aroclor 1016	U	71	U	68	U	83	U	73	U	79	U	76	U	71
Aroclor 1221	U	140	U	140	U	170	U	150	U	160	U	150	U	140
Aroclor 1232	U	71	U	68	U	83	U	73	U	79	U	76	U	71
Aroclor 1242	U	71	U	68	U	83	U	73	U	79	U	76	U	71
Aroclor 1248	U	71	U	68	U	83	U	73	U	79	U	76	U	71
Aroclor 1254	83 W	71	83 W	68	140 W	83	80 W	73	58 W J	79	100 W	76	61 W J	71
Aroclor 1260	120 W	71	370 W	68	360 W	83	160 W	73	390 W	79	210 W	76	110 W	71

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 33 (cont'd) Results of the Analysis for Pesticides/PCBs in Redbreast Sunfish
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00080		00081		00082		00083		00084		00085		00086		00087	
Location	Reference		Reference		Reference		Reference		Reference		Reference		Reference		Reference	
Percent Solid	25		29		29		27		29		29		29		30	
Analyte	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg
a-BHC	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
g-BHC	U	16	U	14	U	14	U	15	1.3 J	14	U	14	U	14	U	13
b-BHC	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
Heptachlor	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
d-BHC	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
Aldrin	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
Heptachlor Epoxide	15 J	16	7.7 J	14	13 J	14	U	15	U	14	U	14	U	14	6.2 J	13
g-Chlordane	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
a-Chlordane	U	16	7.9 J	14	5.6 J	14	U	15	U	14	U	14	U	14	U	13
Endosulfan (I)	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
p,p'-D D E	23	16	17	14	21	14	20	15	18	14	16	14	16	14	17	13
Dieldrin	U	16	11 J	14	U	14	5.7 J	15	4.3 J	14	4.8 J	14	5.6 J	14	4.8 J	13
Endrin	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
p,p'-D D D	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
Endosulfan (II)	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
p,p'-D D T	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
Endrin Aldehyde	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
Endosulfan Sulfate	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
Methoxychlor	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
Endrin Ketone	U	16	U	14	U	14	U	15	U	14	U	14	U	14	U	13
Toxaphene	U	160	U	140	U	140	U	150	U	140	U	140	U	140	U	130
Aroclor 1016	U	79	U	68	U	68	U	73	U	68	U	69	U	68	U	67
Aroclor 1221	U	160	U	140	U	140	U	150	U	140	U	140	U	140	U	130
Aroclor 1232	U	79	U	68	U	68	U	73	U	68	U	69	U	68	U	67
Aroclor 1242	U	79	U	68	U	68	U	73	U	68	U	69	U	68	U	67
Aroclor 1248	U	79	U	68	U	68	U	73	U	68	U	69	U	68	U	67
Aroclor 1254	240 W	79	120 W	68	240 W	68	73 W	73	150 W	68	52 W J	69	51 W J	68	53 W J	67
Aroclor 1260	250 W	79	100 W	68	260 W	68	130 W	73	170 W	68	130 W	69	110 W	68	62 W J	67

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 33 (cont'd) Results of the Analysis for Pesticides/PCBs in Redbreast Sunfish
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00090		00091		00092		00093		00094		MBLK 051997		00095		00096		00097	
Location	Outfall 002		Outfall 002		Outfall 002		Outfall 002		Outfall 002		N/A		Outfall 002		Outfall 002		Outfall 002	
Percent Solid	27		28		26		27		28		100		25		28		25	
Analyte	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg
a-BHC	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
g-BHC	U	15	U	14	0 8 J	15	U	15	U	14	U	4	U	16	U	14	U	16
b-BHC	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
Heptachlor	U	15	U	14	U	15	2 2 J	15	3 9 J	14	U	4	2 8 J	16	2 3 J	14	U	16
d-BHC	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
Aldrin	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
Heptachlor Epoxide	6 3 J	15	4 1 J	14	U	15	U	15	6.7 J	14	U	4	U	16	4 2 J	14	U	16
g-Chlordane	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
a-Chlordane	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
Endosulfan (I)	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
p,p'-D D E	20	15	18	14	26	15	16	15	17	14	U	4	16	16	17	14	21	16
Dieldrin	5 5 J	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	4.6 J	16
Endrin	19	15	U	14	U	15	15	15	12 J	14	U	4	19	16	11 J	14	16	16
p,p'-D D D	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
Endosulfan (II)	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
p,p'-D D T	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
Endrin Aldehyde	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
Endosulfan Sulfate	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
Methoxychlor	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
Endrin Ketone	U	15	U	14	U	15	U	15	U	14	U	4	U	16	U	14	U	16
Toxaphene	U	150	U	140	U	150	U	150	U	140	U	40	U	160	U	140	U	160
Aroclor 1016	U	73	U	71	U	74	U	73	U	71	U	20	U	79	U	71	U	78
Aroclor 1221	U	150	U	140	U	150	U	150	U	140	U	40	U	160	U	140	U	160
Aroclor 1232	U	73	U	71	U	74	U	73	U	71	U	20	U	79	U	71	U	78
Aroclor 1242	U	73	U	71	U	74	U	73	U	71	U	20	U	79	U	71	U	78
Aroclor 1248	U	73	U	71	U	74	U	73	U	71	U	20	U	79	U	71	U	78
Aroclor 1254	66 W J	73	71 W	71	190 W	74	94 W	73	69 W	71	U	20	48 W J	79	63 W J	71	110 W	78
Aroclor 1260	390 W	73	280 W	71	3600 W	74	290 W	73	320 W	71	U	20	250 W	79	190 W	71	120 W	78

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 33 (cont'd) Results of the Analysis for Pesticides/PCBs in Redbreast Sunfish
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00100		00101		00102		00103		00104		00105		00106		00107	
Location	Outfall 004		Outfall 004		Outfall 004		Outfall 004		Outfall 004		Outfall 004		Outfall 004		Outfall 004	
Percent Solid	28		26		26		25		26		26		27		26	
Analyte	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg
a-BHC	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
g-BHC	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
b-BHC	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
Heptachlor	2.1 J	14	1.7 J	15	U	15	U	16	U	15	U	15	5.7 J	15	2.5 J	15
d-BHC	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
Aldrin	U	14	11 J	15	24	15	29	16	16	15	18	15	U	15	U	15
Heptachlor Epoxide	7.1 J	14	U	15	22	15	U	16	16	15	20	15	U	15	13 J	15
g-Chlordane	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
a-Chlordane	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
Endosulfan (I)	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
p,p'-D D E	24	14	32	15	35	15	44	16	38	15	28	15	22	15	25	15
Dieldrin	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
Endrin	11 J	14	21	15	U	15	U	16	22	15	U	15	21	15	U	15
p,p'-D D D	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
Endosulfan (II)	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
p,p'-D D T	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
Endrin Aldehyde	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
Endosulfan Sulfate	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
Methoxychlor	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
Endrin Ketone	U	14	U	15	U	15	U	16	U	15	U	15	U	15	U	15
Toxaphene	U	140	U	150	U	150	U	160	U	150	U	150	U	150	U	150
Aroclor 1016	U	69	U	74	U	74	U	78	U	77	U	77	U	73	U	75
Aroclor 1221	U	140	U	150	U	150	U	160	U	150	U	150	U	150	U	150
Aroclor 1232	U	69	U	74	U	74	U	78	U	77	U	77	U	73	U	75
Aroclor 1242	U	69	U	74	U	74	U	78	U	77	U	77	U	73	U	75
Aroclor 1248	U	69	U	74	U	74	U	78	U	77	U	77	U	73	U	75
Aroclor 1254	120 W	69	240 W	74	450 W	74	1300 W	78	490 W	77	890 W	77	370 W	73	550 W	75
Aroclor 1260	360 W	69	420 W	74	2100 W	74	1100 W	78	400 W	77	3400 W	77	360 W	73	2600 W	75

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 33 (cont'd.) Results of the Analysis for Pesticides/PCBs in Redbreast Sunfish
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00110		00111		00112		00113		00114		00115		00116		00117	
Location	Downstream		Downstream		Downstream		Downstream		Downstream		Downstream		Downstream		Downstream	
Percent Solid	28		25		27		29		26		23		25		24	
Analyte	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg	µg/Kg	MDL µg/Kg
a-BHC	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
g-BHC	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
b-BHC	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Heptachlor	2 3 J	14	5 1 J	15	5 2 J	14	4 2 J	14	U	15	3 7 J	17	U	15	2.4 J	17
d-BHC	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Aldrin	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Heptachlor Epoxide	37	14	13 J	15	19	14	13 J	14	15	15	17 J	17	27	15	20	17
g-Chlordane	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
a-Chlordane	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Endosulfan (I)	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
p,p'-D D E	49	14	31	15	36	14	32	14	35	15	38	17	53	15	58	17
Dieldrin	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Endrin	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
p,p'-D D D	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Endosulfan (II)	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
p,p'-D D T	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Endrin Aldehyde	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Endosulfan Sulfate	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Methoxychlor	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Endrin Ketone	U	14	U	15	U	14	U	14	U	15	U	17	U	15	U	17
Toxaphene	U	140	U	150	U	140	U	140	U	150	U	170	U	150	U	170
Aroclor 1016	U	70	U	76	U	69	U	68	U	74	U	87	U	77	U	83
Aroclor 1221	U	140	U	150	U	140	U	140	U	150	U	170	U	150	U	170
Aroclor 1232	U	70	U	76	U	69	U	68	U	74	U	87	U	77	U	83
Aroclor 1242	U	70	U	76	U	69	U	68	U	74	U	87	U	77	U	83
Aroclor 1248	U	70	U	76	U	69	U	68	U	74	U	87	U	77	U	83
Aroclor 1254	U	70	U	76	U	69	U	68	U	74	U	87	U	77	U	83
Aroclor 1260	16000 W	70	6200 W	76	9200 W	69	3700 W	68	6200 W	74	9600 W	87	16000 W	77	9000 W	83

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 34. Summary of Results of the Analysis of Metals and PCBs in Redbreast Sunfish
Avetx Fibers Site
Front Royal, VA
February 1999

Location Solids		Reference 28		Outfall 001 (BMI-1) 27		Outfall 002 (BMI-2) 27		Outfall 004 (BMI-4) 28		Downstream (BMI-6) 26	
Parameter		Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg
Arsenic	Mean	*0.22*	*0.062*	*0.32*	*0.086*	*0.29*	*0.078*	*0.3*	*0.078*	*0.27*	*0.070*
	Max	*0.27*	*0.076*	*0.55*	*0.15*	*0.38*	*0.10*	*0.36*	*0.094*	*0.39*	*0.10*
Cadmium	Mean	*0.32*	*0.09*	*0.43*	*0.12*	*0.44*	*0.12*	*0.45*	*0.12*	*0.41*	*0.12*
	Max	*0.41*	*0.12*	*0.50*	*0.14*	*0.55*	*0.15*	*0.56*	*0.15*	*0.60*	*0.16*
Chromium	Mean	1.4	0.39	1.3	0.35	1.3	0.35	1.4	0.36	1.3	0.34
	Max	2.5	0.7	2.1	0.57	2.7	0.73	2.3	0.60	1.8	0.47
Copper	Mean	1.6	0.45	4.2	1.1	2.7	0.73	2.9	0.75	3.1	0.81
	Max	2.9	0.81	17	4.6	4.1	1.1	5.4	1.4	5.8	1.5
Lead	Mean	0.25	0.07	*0.29*	*0.078*	*0.29*	*0.078*	0.40	0.10	*0.27*	*0.070*
	Max	0.49	0.14	*0.34*	*0.092*	*0.38*	*0.10*	0.96	0.25	*0.39*	*0.10*
Mercury	Mean	0.69	0.19	0.76	0.21	0.81	0.22	0.71	0.19	0.72	0.19
	Max	0.97	0.27	1.0	0.27	0.95	0.26	1.0	0.27	1.0	0.27
Nickel	Mean	*1.1*	*0.31*	*1.4*	*0.38*	*1.4*	*0.38*	*1.5*	*0.39*	*1.4*	*0.36*
	Max	*1.4*	*0.39*	*1.7*	*0.46*	*1.9*	*0.51*	*1.8*	*0.47*	*2.0*	*0.52*
Zinc	Mean	67	19	70	19	71	19	75	20	80	21
	Max	79	22	86	23	90	24	91	24	100	27
PCBs	Mean	0.27	0.076	0.33	0.089	0.77	0.21	1.9	0.49	9.5	2.5
	Max	0.50	0.14	0.50	0.14	3.8	1.0	4.3	1.1	16	4.2

Values in italics were not detected
mg/kg - milligram per kilogram
PCBs - Total of Aroclor 1254 and 1260

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Table 35. Results of the Metals Analysis in Redbreast Sunfish
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	11-215-00090		11-215-00091		11-215-00092		11-215-00093		11-215-00094		11-215-00095		11-215-00096		11-215-00097	
Location	Outfall 002		Outfall 002		Outfall 002		Outfall 002		Outfall 002		Outfall 002		Outfall 002		Outfall 002	
% Solids	27		28		26		27		28		25		28		27	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	43	12	25	15	23	18	U	14	31	14	U	19	15	8.3	U	17
Antimony	U	0.48	U	0.59	U	0.71	U	0.57	U	0.56	U	0.75	U	0.33	U	0.67
Arsenic	U	0.48	U	0.59	U	0.71	U	0.57	U	0.56	U	0.75	U	0.33	U	0.67
Barium	3.4	0.72	2.7	0.88	4	1.1	2.1	0.85	1.8	0.84	6.7	1.1	3.5	0.5	2.9	1.0
Beryllium	U	0.48	U	0.59	U	0.71	U	0.57	U	0.56	U	0.75	U	0.33	U	0.67
Cadmium	U	0.72	U	0.88	U	1.1	U	0.85	U	0.84	U	1.1	U	0.5	U	1.0
Calcium	34000	24	41000	29	41000	35	38000	28	34000	28	50000	37	31000	17	37000	33
Chromium	U	1.2	U	1.5	U	1.8	2.7	1.4	2.5	1.4	U	1.9	1.5	0.83	U	1.7
Cobalt	U	1.2	U	1.5	U	1.8	U	1.4	U	1.4	U	1.9	U	0.83	U	1.7
Copper	4.1	1.2	1.6	1.5	2.5	1.8	2.3	1.4	1.8	1.4	2.9	1.9	3.7	0.83	2.3	1.7
Iron	92	6.0	46	7.4	37	8.8	64	7.1	51	7.0	54	9.3	34	4.2	59	8.3
Lead	U	0.48	U	0.59	U	0.71	U	0.57	U	0.56	U	0.75	U	0.33	U	0.67
Magnesium	1400	120	1400	150	1400	180	1400	140	1300	140	1600	190	1200	83	1300	170
Manganese	22	0.48	22	0.59	22	0.71	16	0.57	13	0.56	17	0.75	16	0.33	18	0.67
Mercury	0.82	0.16	0.95	0.14	0.81	0.16	0.85	0.11	0.8	0.16	0.89	0.14	0.72	0.09	0.66	0.13
Nickel	U	2.4	U	2.9	U	3.5	U	2.8	U	2.8	U	3.7	U	1.7	U	3.3
Potassium	12000	480	10000	590	11000	710	11000	570	10000	560	12000	750	11000	330	11000	670
Selenium	1.2	0.48	1.3	0.59	1	0.71	1.3	0.57	1.2	0.56	1.3	0.75	0.93	0.33	1.2	0.67
Silver	U	1.2	U	1.5	U	1.8	U	1.4	U	1.4	U	1.9	U	0.83	U	1.7
Sodium	3400	120	3500	150	3700	180	3600	140	3300	140	4500	190	3200	83	3800	170
Thallium	U	0.48	U	0.59	U	0.71	U	0.57	U	0.56	U	0.75	U	0.33	U	0.67
Vanadium	U	1.2	U	1.5	U	1.8	U	1.4	U	1.4	U	1.9	U	0.83	U	1.7
Zinc	58	1.2	73	1.5	67	1.8	77	1.4	60	1.4	90	1.9	62	0.83	82	1.7

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated

Table 35 (cont'd.). Results of the Metals Analysis in Redbreast Sunfish
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	11-215-00100		11-215-00101		11-215-00102		11-215-00103		11-215-00104		11-215-00105		11-215-00106		11-215-00107	
Location	Outfall 004		Outfall 004		Outfall 004		Outfall 004		Outfall 004		Outfall 004		Outfall 004		Outfall 004	
% Solids	28		26		26		25		26		26		27		26	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	21	16	26	14	69	17	40	16	47	18	43	14	50	13	U	12
Antimony	U	0.64	U	0.56	U	0.69	U	0.62	U	0.71	U	0.57	U	0.50	U	0.49
Arsenic	U	0.64	U	0.56	U	0.69	U	0.62	U	0.71	U	0.57	U	0.50	U	0.49
Barium	3.2	0.97	6.5	0.83	1.9	1.0	3.8	0.93	6.2	1.1	4.4	0.86	5.6	0.76	2.5	0.74
Beryllium	U	0.64	U	0.56	U	0.69	U	0.62	U	0.71	U	0.57	U	0.50	U	0.49
Cadmium	U	0.97	U	0.83	U	1.0	U	0.93	U	1.1	U	0.86	U	0.76	U	0.74
Calcium	31000	32	48000	28	28000	34	34000	31	41000	36	55000	29	42000	25	40000	25
Chromium	U	1.6	2.3	1.4	U	1.7	U	1.6	2.2	1.8	U	1.4	1.9	1.3	1.5	1.2
Cobalt	U	1.6	U	1.4	U	1.7	U	1.6	U	1.8	U	1.4	U	1.3	U	1.2
Copper	3.1	1.6	2.4	1.4	2.6	1.7	2.2	1.6	5.4	1.8	3.3	1.4	2.0	1.3	1.9	1.2
Iron	33	8.0	70	6.9	82	8.6	65	7.8	83	8.9	82	7.1	65	6.3	53	6.1
Lead	U	0.64	U	0.56	0.96J	0.69	U	0.62	U	0.71	U	0.57	U	0.50	U	0.49
Magnesium	1200	160	1400	140	1300	170	1400	160	1400	180	1600	140	1400	130	1400	120
Manganese	11	0.64	32	0.56	9.0	0.69	14	0.62	18	0.71	16	0.57	17	0.50	13	0.49
Mercury	1.00	0.13	0.58	0.12	0.89	0.14	0.64	0.14	0.54	0.15	0.64	0.14	0.72	0.12	0.70	0.12
Nickel	U	3.2	U	2.8	U	3.4	U	3.1	U	3.6	U	2.9	U	2.5	U	2.5
Potassium	10000	640	9100	560	11000	690	11000	620	11000	710	10000	570	10000	500	9700	490
Selenium	0.82	0.64	1.1	0.56	1.1	0.69	0.86	0.62	0.71	0.71	1.2	0.57	0.64	0.50	1.0	0.49
Silver	U	1.6	U	1.4	U	1.7	U	1.6	U	1.8	U	1.4	U	1.3	U	1.2
Sodium	3000	160	4900	140	3000	170	3200	160	3500	180	4100	140	3700	130	4000	120
Thallium	U	0.64	U	0.56	U	0.69	U	0.62	U	0.71	U	0.57	U	0.50	U	0.49
Vanadium	U	1.6	U	1.4	U	1.7	U	1.6	U	1.8	U	1.4	U	1.3	U	1.2
Zinc	61	1.6	91	1.4	62	1.7	70	1.6	67	1.8	87	1.4	84	1.3	79	1.2

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated

Table 35 (cont'd.). Results of the Metals Analysis in Redbreast Sunfish
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	11-215-00110		11-215-00111		11-215-00112		11-215-00113		11-215-00114		11-215-00115		11-215-00116		11-215-00117	
Location	Downstream		Downstream		Downstream		Downstream		Downstream		Downstream		Downstream		Downstream	
% Solids	28		25		27		29		26		23		25		24	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	26	15	15	13	26	19	U	18	U	9.3	14	11	U	10	U	12
Antimony	U	0.59	U	0.52	U	0.78	U	0.73	U	0.37	U	0.45	U	0.41	U	0.48
Arsenic	U	0.59	U	0.52	U	0.78	U	0.73	U	0.37	U	0.45	U	0.41	U	0.48
Barium	2.2	0.88	2.9	0.77	2.8	1.2	1.7	1.1	3.2	0.56	3.3	0.68	1.5	0.61	3.6	0.72
Beryllium	U	0.59	U	0.52	U	0.78	U	0.73	U	0.37	U	0.45	U	0.41	U	0.48
Cadmium	U	0.88	U	0.77	U	1.2	U	1.1	U	0.56	U	0.68	U	0.61	U	0.72
Calcium	35000	29	51000	26	41000	39	38000	36	51000	19	43000	23	31000	20	53000	24
Chromium	U	1.5	1.5	1.3	U	1.9	U	1.8	1.5	0.93	1.8	1.1	1.2	1.0	1.5	1.2
Cobalt	U	1.5	U	1.3	U	1.9	U	1.8	U	0.93	U	1.1	U	1.0	U	1.2
Copper	4	1.5	2.5	1.3	2.8	1.9	1.8	1.8	3	0.93	1.5	1.1	5.8	1.0	3.3	1.2
Iron	55	7.3	41	6.4	48	9.7	32	9.1	49	4.7	23	5.7	35	5.1	63	6.0
Lead	U	0.59	U	0.52	U	0.78	U	0.73	U	0.37	U	0.45	U	0.41	U	0.48
Magnesium	1200	150	1800	130	1400	190	1400	180	1500	93	1600	110	1400	100	1800	120
Manganese	10	0.59	30	0.52	22	0.78	11	0.73	28	0.37	19	0.45	10	0.41	22	0.48
Mercury	0.68	0.09	0.73	0.12	0.81	0.16	0.44	0.15	0.62	0.11	0.85	0.13	0.6	0.13	1.0	0.10
Nickel	U	2.9	U	2.6	U	3.9	U	3.6	U	1.9	U	2.3	U	2.0	U	2.4
Potassium	9200	590	13000	520	11000	780	11000	730	11000	370	14000	450	12000	410	12000	480
Selenium	1.7	0.59	1.3	0.52	1.4	0.78	1.6	0.73	1.2	0.37	1.1	0.45	1.1	0.41	0.86	0.48
Silver	U	1.5	U	1.3	U	1.9	U	1.8	U	0.93	U	1.1	U	1.0	U	1.2
Sodium	3600	150	3800	130	3500	190	3700	180	4500	93	3600	110	3300	100	4500	120
Thallium	U	0.59	U	0.52	U	0.78	U	0.73	U	0.37	U	0.45	U	0.41	U	0.48
Vanadium	U	1.5	U	1.3	U	1.9	U	1.8	U	0.93	U	1.1	U	1.0	U	1.2
Zinc	66	1.5	86	1.3	67	1.9	82	1.8	100	0.93	71	1.1	66	1.0	99	1.2

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated

Table 35 (cont'd.). Results of the Metals Analysis in Redbreast Sunfish
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	11-215-00070		11-215-00071		11-215-00072		11-215-00073		11-215-00074		11-215-00075		11-215-00076		11-215-00077	
Location	Outfall 001		Outfall 001		Outfall 001		Outfall 001		Outfall 001		Outfall 001		Outfall 001		Outfall 001	
% Solids	28		28		29		24		27		25		26		28	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	14	U	14	U	17	U	15	U	14	U	14	U	13	31	14
Antimony	U	0.56	U	0.57	U	0.67	U	0.58	U	0.55	U	0.54	U	0.53	U	0.58
Arsenic	U	1.1	U	0.57	U	0.67	U	0.58	U	0.55	U	0.54	U	0.53	U	0.58
Barium	2.6	0.84	2.9	0.85	2.7	1.0	3.7	0.88	3.6	0.83	2.4	0.81	2.8	0.8	2.4	0.86
Beryllium	U	0.56	U	0.57	U	0.67	U	0.58	U	0.55	U	0.54	U	0.53	U	0.58
Cadmium	U	0.84	U	0.85	U	1.0	U	0.88	U	0.83	U	0.81	U	0.8	U	0.86
Calcium	34000	28	32000	28	39000	33	50000	29	50000	28	43000	27	44000	27	38000	29
Chromium	U	1.4	U	1.4	2.1	1.7	U	1.5	1.7	1.4	1.9	1.4	1.5	1.3	U	1.4
Cobalt	U	1.4	U	1.4	U	1.7	U	1.5	U	1.4	U	1.4	U	1.3	U	1.4
Copper	10	1.4	1.5	1.4	17	1.7	U	1.5	2.5	1.4	U	1.4	U	1.3	U	1.4
Iron	28	7.0	46	7.1	40	8.3	52	7.3	28	6.9	39	6.8	42	6.7	79	7.2
Lead	U	0.56	U	0.57	U	0.67	U	0.58	U	0.55	U	0.54	U	0.53	U	0.58
Magnesiu	1100	140	1200	140	1300	170	1600	150	1500	140	1500	140	1500	130	1400	140
Manganes	8.8	0.56	13	0.57	16	0.67	14	0.58	21	0.55	11	0.54	13	0.53	21	0.58
Mercury	0.69	0.13	0.74	0.14	0.67	0.13	1.0	0.17	0.65	0.12	0.89	0.16	0.71	0.13	0.70	0.12
Nickel	U	2.8	U	2.8	U	3.3	U	2.9	U	2.8	U	2.7	U	2.7	U	2.9
Potassium	9100	560	10000	570	10000	670	12000	580	11000	550	12000	540	11000	530	12000	580
Selenium	1.1	0.56	1.1	0.57	1.3	0.67	1.4	0.58	1.3	0.55	1.4	0.54	1.8	0.53	1.8	0.56
Silver	U	1.4	U	1.4	U	1.7	U	1.5	U	1.4	U	1.4	U	1.3	U	1.4
Sodium	3600	140	3500	140	3400	170	4400	150	3900	140	4000	140	3900	130	3900	140
Thallium	U	0.56	U	0.57	U	0.67	U	0.58	U	0.55	U	0.54	U	0.53	U	0.58
Vanadium	U	1.4	U	1.4	U	1.7	U	1.5	U	1.4	U	1.4	U	1.3	U	1.4
Zinc	50	1.4	63	1.4	61	1.7	86	1.5	67	1.4	82	1.4	81	1.3	68	1.4

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated

Table 35 (cont'd.). Results of the Metals Analysis in Redbreast Sunfish
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID Location % Solids	11-215-00080 Reference 25		11-215-00081 Reference 29		11-215-00082 Reference 29		11-215-00083 Reference 27		11-215-00084 Reference 29		11-215-00085 Reference 29		11-215-00086 Reference 29		11-215-00087 Reference 30	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	11	U	8.5	U	8.7	U	10	12	10	U	11	U	14	U	13
Antimony	U	0.43	U	0.34	U	0.35	U	0.42	U	0.42	U	0.45	U	0.54	U	0.52
Arsenic	U	0.43	U	0.34	U	0.35	U	0.42	U	0.42	U	0.45	U	0.54	U	0.52
Barium	2.4	0.65	2.8	0.51	3.0	0.52	3	0.63	3.5	0.63	3.3	0.67	2.8	0.82	3.8	0.79
Beryllium	U	0.43	U	0.34	U	0.35	U	0.42	U	0.42	U	0.45	U	0.54	U	0.52
Cadmium	U	0.65	U	0.51	U	0.52	U	0.63	U	0.63	U	0.67	U	0.82	U	0.79
Calcium	36000	22	32000	17	40000	17	35000	21	35000	21	42000	22	36000	27	34000	26
Chromium	2.1	1.1	2.5	0.85	1.2	0.87	1.3	1.0	U	1.0	1.6	1.1	1.4	1.4	U	1.3
Cobalt	U	1.1	U	0.85	U	0.87	U	1.0	U	1.0	U	1.1	U	1.4	U	1.3
Copper	2.9	1.1	1.8	0.85	1.2	0.87	1.4	1.0	1.8	1.0	1.7	1.1	1.5	1.4	U	1.3
Iron	46	5.4	47	4.3	32	4.4	36	5.2	38	5.2	40	5.6	32	6.8	24	6.6
Lead	U	0.43	U	0.34	U	0.35	U	0.42	U	0.42	0.49	0.45	U	0.54	U	0.52
Magnesiu	1400	110	1300	85	1400	87	1300	100	1200	100	1400	110	1300	140	1200	130
Manganes	9.6	0.43	13	0.34	13	0.35	11	0.42	25	0.42	15	0.45	12	0.54	17	0.52
Mercury	0.69	0.11	0.62	0.12	0.97	0.13	0.74	0.14	0.66	0.13	0.51	0.11	0.81	0.12	0.55	0.12
Nickel	U	2.2	U	1.7	U	1.7	U	2.1	U	2.1	U	2.2	U	2.7	U	2.6
Potassium	12000	430	11000	340	11000	350	10000	420	9900	420	10000	450	9900	540	8900	520
Selenium	1.4	0.43	1.3	0.34	1.2	0.35	1.3	0.42	1.4	0.42	1.1	0.45	1.1	0.54	1.0	0.52
Silver	U	1.1	U	0.85	U	0.87	U	1.0	U	1.0	U	1.1	U	1.4	U	1.3
Sodium	4200	110	3200	85	3500	87	3500	100	3100	100	3600	110	3200	140	2900	130
Thallium	U	0.43	U	0.34	U	0.35	U	0.42	U	0.42	U	0.45	U	0.54	U	0.52
Vanadium	U	1.1	U	0.85	U	0.87	U	1.0	U	1.0	U	1.1	U	1.4	U	1.3
Zinc	79	1.1	64	0.85	73	0.87	74	1.0	54	1.0	71	1.1	60	1.4	61	1.3

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated

Table 36. Results of the Analysis for Pesticides/PCBs in Carp
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	00060		00061		00062		00063		00064		00065		00066	
Location	Sulfate Basin #5		Sulfate Basin #5		Sulfate Basin #5		Sulfate Basin #5		Sulfate Basin #5		Sulfate Basin #5		Sulfate Basin #5	
Percent Solid	19		20		23		20		20		22		23	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
a-BHC	U	21	U	20	U	17	U	20	U	20	U	18	U	17
g-BHC	U	21	U	20	U	17	U	20	U	20	U	18	U	17
b-BHC	3.9J	21	U	20	U	17	7.4J	20	U	20	U	18	U	17
Heptachlor	U	21	U	20	U	17	U	20	U	20	5.8J	18	U	17
d-BHC	U	21	U	20	U	17	U	20	U	20	U	18	U	17
Aldrin	U	21	U	20	U	17	4.8J	20	U	20	5.6J	18	U	17
Heptachlor Epoxide	U	21	U	20	U	17	U	20	U	20	U	18	U	17
g-Chlordane	U	21	U	20	U	17	U	20	U	20	U	18	U	17
a-Chlordane	U	21	U	20	U	17	U	20	U	20	U	18	7.0J	17
Endosulfan (I)	U	21	U	20	U	17	U	20	U	20	U	18	U	17
p,p'-D D E	11J	21	8.7J	20	6.6J	17	8.5J	20	11J	20	13J	18	4.5J	17
Dieldrin	U	21	U	20	U	17	U	20	U	20	U	18	U	17
Endrin	U	21	U	20	U	17	U	20	U	20	26	18	U	17
p,p'-D D D	U	21	U	20	U	17	U	20	U	20	U	18	U	17
Endosulfan (II)	U	21	U	20	U	17	U	20	U	20	U	18	U	17
p,p'-D D T	U	21	U	20	U	17	U	20	U	20	U	18	U	17
Endrin Aldehyde	U	21	U	20	U	17	U	20	U	20	U	18	U	17
Endosulfan Sulfate	U	21	U	20	U	17	U	20	U	20	U	18	U	17
Methoxychlor	U	21	U	20	U	17	U	20	U	20	U	18	U	17
Endrin Ketone	U	21	U	20	3.8J	17	U	20	U	20	U	18	U	17
Toxaphene	U	210	U	200	U	170	U	200	U	200	U	180	U	170
Aroclor 1016	U	110	U	99	U	87	U	99	U	100	U	91	U	86
Aroclor 1221	U	210	U	200	U	170	U	200	U	200	U	180	U	170
Aroclor 1232	U	110	U	99	U	87	U	99	U	100	U	91	U	86
Aroclor 1242	U	110	U	99	U	87	U	99	U	100	U	91	U	86
Aroclor 1248	U	110	U	99	U	87	U	99	U	100	U	91	U	86
Aroclor 1254	170W	110	200WJ	99	180WJ	87	270W	99	290W	100	110WJ	91	170WJ	86
Aroclor 1260	190W	110	190WJ	99	130WJ	87	210W	99	180W	100	110WJ	91	160WJ	86

MDL denotes Method Detection Limit
U denotes less than the MDL
J denotes the value is estimated
W denotes the compound is weathered

Table 37. Summary of Results of the Analysis of
Metals and PCBs in Carp
Avetx Fibers Site
Front Royal, VA
February 1999

Location		Sulfate Basin No. 5	
Solids		21	
Parameter		Dry Weight mg/kg	Wet Weight mg/kg
Arsenic	Mean	*0.41*	*0.086*
	Max	*0.75*	*0.16*
Cadmium	Mean	*0.53*	*0.11*
	Max	*0.60*	*0.13*
Chromium	Mean	2.3	0.48
	Max	3.2	0.67
Copper	Mean	11	2.3
	Max	42	11
Lead	Mean	0.63	0.13
	Max	2.3	0.48
Mercury	Mean	0.11	0.023
	Max	0.19	0.040
Nickel	Mean	*1.8*	*0.38*
	Max	*2.0*	*0.42*
Zinc	Mean	480	100
	Max	1300	270
PCBs	Mean	0.37	0.078
	Max	0.48	0.10

Values in italics were not detected
mg/kg - milligram per kilogram
PCBs - Total of Aroclor 1254 and 1260

Table 38. Results of the Metals Analysis in Carp.
Avtex Fibers Site
Front Royal, VA
February 1999

Client ID	060		061		062		063		064		065		066	
Location	Sulfate Basin No 5		Sulfate Basin No 5		Sulfate Basin No 5		Sulfate Basin No 5		Sulfate Basin No 5		Sulfate Basin No 5		Sulfate Basin No 5	
% Solids	19		20		23		20		20		22		23	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	24	20	U	13	90	15	350	19	U	19	U	19	88	19
Antimony	U	0.81	U	0.52	U	0.59	U	0.76	U	0.78	U	0.76	U	0.74
Arsenic	U	0.81	U	0.52	U	0.59	U	0.76	U	0.78	U	1.5	U	0.74
Barium	23	1.2	11	0.78	31	0.88	27	1.1	6.9	1.2	9.4	1.1	18	1.1
Beryllium	U	0.81	U	0.52	U	0.59	U	0.76	U	0.78	U	0.76	U	0.74
Cadmium	U	1.2	U	0.78	U	0.88	U	1.1	U	1.2	U	1.1	U	1.1
Calcium	59000	41	62000	26	81000	29	60000	38	28000	39	57000	38	58000	37
Chromium	3.2	2.0	2.0	1.3	2.4	1.5	3.2	1.9	U	1.9	2	1.9	2.5	1.9
Cobalt	U	2.0	U	1.3	U	1.5	U	1.9	U	1.9	U	1.9	U	1.9
Copper	3.3	2.0	18	1.3	3	1.5	42	1.9	4.4	1.9	6.3	1.9	2.0	1.9
Iron	90	10	97	6.5	170	7.4	480	9.6	68	9.7	60	9.6	150	9.3
Lead	U	0.81	U	0.52	U	0.59	2.3	0.76	U	0.78	U	0.76	U	0.74
Magnesiu	2000	200	2000	130	2200	150	2000	190	1500	190	1800	190	1700	190
Manganes	11	0.81	10	0.52	15	0.59	24	0.76	5.2	0.78	5.5	0.76	11	0.74
Mercury	0.16	0.16	U	0.17	U	0.13	U	0.14	U	0.2	0.19	0.19	U	0.17
Nickel	U	4.1	U	2.6	U	2.9	U	3.8	U	3.9	U	3.8	U	3.7
Potassium	12000	810	15000	520	10000	590	13000	760	14000	780	12000	760	11000	740
Selenium	1.6	0.81	1.3	0.52	2.3	0.59	2.4	0.76	1.7	0.78	1.4	0.76	1.0	0.74
Silver	U	2.0	U	1.3	U	1.5	U	1.9	U	1.9	U	1.9	U	1.9
Sodium	4800	200	4400	130	5300	150	6100	190	3500	190	4800	190	4800	190
Thallium	U	0.81	U	0.52	U	0.59	U	0.76	U	0.78	U	0.76	U	0.74
Vanadium	U	2.0	U	1.3	U	1.5	2.1	1.9	U	1.9	U	1.9	U	1.9
Zinc	420	2.0	300	1.3	420	1.5	1300	1.9	280	1.9	300	1.9	360	1.9

MDL denotes Method Detection Limit
U denotes less than the MDL

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Table 39 Results of the Metals Analysis in Small Mammal Tissue
Avtex Fibers Site
Front Royal, VA
March 1998
Reference

Client ID	11-215-00202		11-215-00203		11-215-00209		11-215-00210		11-215-00211		11-215-00212		11-215-00213		11-215-00214		11-215-00215	
Location	REF -5-19		REF -2-11		REF 6-1		REF-6-7		REF-5-18		REF-2-10		REF-5-10		REF-1-17		REF-4-17	
% Solids	30		26		30		29		25		25		31		32		26	
Species	Blarina		Microtus		Blarina		Blarina		Microtus		Microtus		Blarina		Blarina		Blarina	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	280	16	29	15	94	9 7	110	9 7	130	12	46	19	110	15	290	9 8	260	10
Antimony	U	0 65	U	0 62	U	0 39	U	0 39	U	0 48	U	0 76	U	0 60	U	0 39	U	0 40
Arsenic	U	0 65	U	0 62	U	0 39	U	0 39	U	0 48	U	0 76	U	0.60	0 49	0 39	0 49	0 40
Barium	8,7	0 98	22	0 93	5 2	0 58	5,2	0 58	32	0 72	46	1.1	21	0 89	12	0 59	14	0.61
Beryllium	U	0 65	U	0 62	U	0 39	U	0 39	U	0 48	U	0.76	U	0 60	U	0 39	U	0.40
Cadmium	1.0	0 98	U	0 93	U	0 58	0 73	0 58	U	0 72	U	1.1	U	0 89	0 74	0 59	U	0.61
Calcium	35000	33	26000	31	40000	19	30000	19	30000	24	23000	38	56000	30	26000	20	31000	20
Chromium	2 6	1 6	1 6	1 5	2 5	0 97	2,8	0 97	1.9	1 2	2.2	1 9	2.1	1 5	4 0	0 98	2.2	1 0
Cobalt	1 8	1 6	U	1 5	U	0 97	U	0 97	U	1 2	U	1 9	U	1 5	U	0.98	U	1 0
Copper	10	1 6	7 4	1 5	9 3	0 97	10	0 97	7.7	1 2	8.9	1 9	12	1 5	13	0.98	15	1 0
Iron	700	8 2	230	7.7	350	4 8	450	4.8	280	6	210	9.5	390	7 5	730	4.9	760	5 1
Lead	1 2	0 65	U	0.62	1 3	0 39	1 2	0 39	U	0.48	U	0.76	13	0.60	1,3	0 39	0.77	0.40
Magnesium	1200	160	1300	150	1200	97	1000	97	1600	120	1500	190	1500	150	1200	98	1100	100
Manganese	23	0.65	13	0.62	5 9	0 39	6 9	0 39	38	0.48	34	0.76	6.1	0.60	46	0 39	19	0.40
Mercury	0 23	0 15	U	0 18	0 26	0 13	0 21	0 14	U	0.14	U	0,15	0 49	0,12	0 21	0.11	0,21	0,14
Nickel	U	3 3	U	3 1	U	1.9	U	1 9	U	2,4	U	3.8	U	3.0	U	2.0	U	2.0
Potassium	9300	650	11000	620	8400	390	8400	390	12000	480	12000	760	8900	600	8000	390	8900	400
Selenium	2 4	0 65	U	0 62	1 9	0 39	2 2	0 39	U	0.48	U	0 76	1.5	0.60	2 3	0 39	2.2	0 40
Silver	U	1 6	U	1 5	U	0 97	U	0 97	U	1 2	U	1.9	U	1.5	U	0 98	U	1.0
Sodium	4400	160	4200	150	4300	97	4600	97	4200	120	3900	190	4300	150	4000	98	5100	100
Thallium	U	0.65	U	0.62	U	0.39	U	0 39	U	0.48	U	0.76	U	0.60	U	0 39	U	0.40
Vanadium	U	1 6	U	1 5	U	0 97	U	0 97	U	1 2	U	1.9	U	1 5	0.98	0.98	1.1	1.0
Zinc	180	1 6	91	1 5	140	0 97	130	0.97	81	1 2	83	1.9	140	1.5	140	0 98	130	1.0

MDL denotes Method Detection Limit
U denotes less than the MDL (not detected)

Table 39 (cont'd) Results of the Metals Analysis in Small Mammal Tissue
Avtex Fibers Site
Front Royal, VA
February 1999
Reference

Client ID	11-215-00216		11-215-00220		11-215-00221		11-215-00224		11-215-00225		11-215-00226		11-215-00229		11-215-00234	
Location	REF-5-9		REF-1-8		REF-1-17		REF-5-20		REF-5-19		REF-2-12		REF-6-10		REF-6-9	
% Solids	29		28		25		27		30		26		30		24	
Species	Blarina		Blarina		Microtus		Microtus		Blarina		Microtus		Blarina		Microtus	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	140	13	120	12	290	17	100	13	210	9.6	45	15	120	11	48	26
Antimony	U	0.52	U	0.46	U	0.68	U	0.53	U	0.38	U	0.58	U	0.42	U	1.1
Arsenic	0.55	0.52	U	0.46	U	0.68	U	0.53	0.46	0.38	U	0.58	0.44	0.42	U	1.1
Barium	3.9	0.78	5.8	0.69	42	1.0	25	0.79	6.1	0.58	36	0.87	4.6	0.63	29	1.6
Beryllium	U	0.52	U	0.46	U	0.68	U	0.53	U	0.38	U	0.58	U	0.42	U	1.1
Cadmium	1.6	0.78	0.73	0.69	U	1.0	U	0.79	U	0.58	U	0.87	1.2	0.63	U	1.6
Calcium	31000	26	40000	23	26000	34	21000	26	19000	19	26000	29	31000	21	23000	53
Chromium	2.1	1.3	2.5	1.2	2.8	1.7	1.8	1.3	1.1	0.96	1.6	1.5	2.5	1.1	U	2.6
Cobalt	1.8	1.3	U	1.2	U	1.7	U	1.3	U	0.96	U	1.5	U	1.1	U	2.6
Copper	11	1.3	10	1.2	9.9	1.7	9.8	1.3	15	0.96	8.4	1.5	9.5	1.1	20	2.6
Iron	410	6.5	400	5.8	400	8.5	270	6.6	560	4.8	190	7.3	310	5.3	250	13
Lead	2.1	0.52	1.3	0.46	U	0.68	10	0.53	0.81	0.38	U	0.58	1.1	0.42	U	1.1
Magnesium	1100	130	1300	120	1600	170	1500	130	830	96	1400	150	1100	110	1300	260
Manganese	9.1	0.52	8.1	0.46	39	0.68	50	0.53	13	0.38	25	0.58	7.4	0.42	22	1.1
Mercury	0.27	0.13	0.22	0.11	U	0.16	U	0.13	0.15	0.10	U	0.13	0.15	0.10	U	0.17
Nickel	U	2.6	U	2.3	U	3.4	U	2.6	U	1.9	U	2.9	U	2.1	U	5.3
Potassium	8800	520	9400	460	12000	680	12000	530	7500	380	11000	580	8900	420	11000	1100
Selenium	2.5	0.52	2.5	0.46	U	0.68	U	0.53	1.4	0.38	U	0.58	2.4	0.42	U	1.1
Silver	U	1.3	U	1.2	U	1.7	U	1.3	U	0.96	U	1.5	U	1.1	U	2.6
Sodium	4500	130	4600	120	3900	170	4200	130	4000	96	3600	150	4400	110	4400	260
Thallium	U	0.52	U	0.46	U	0.68	U	0.53	U	0.38	U	0.58	U	0.42	U	1.1
Vanadium	U	1.3	U	1.2	U	1.7	U	1.3	U	0.96	U	1.5	U	1.1	U	2.6
Zinc	240	1.3	160	1.2	78	1.7	84	1.3	97	0.96	76	1.5	140	1.1	86	2.6

MDL denotes Method Detection Limit
U denotes less than the MDL (not detected)

Table 39 (cont'd) Results of the Metals Analysis in Small Mamal Tissue
Avtex Fibers Site
Front Royal, VA
February 1999
Treatment Plant

Client ID	11-215-00201		11-215-00205		11-215-00231		11-215-00232		11-215-00233		11-215-00237		11-215-00238	
Location	TP-6-9		TP-3-19		TP-1-2		TP-1-1		TP-2-2		TP-4A-8		TP-7-5	
% Solids	27		27		30		30		28		27		28	
Species	Microtus		Microtus		Microtus		Microtus		Microtus		Peromyscus			
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	63	16	53	13	120	13	72	15	71	15	170	12	74	11
Antimony	U	0.65	U	0.52	U	0.51	U	0.59	U	0.61	U	0.47	U	0.43
Arsenic	U	0.65	U	0.52	U	0.51	U	0.59	U	0.61	U	0.47	U	0.43
Barium	8.1	0.98	14	0.78	6	0.77	9.8	0.89	3.3	0.92	4.6	0.71	12	0.64
Beryllium	U	0.65	U	0.52	U	0.51	U	0.59	U	0.61	U	0.47	U	0.43
Cadmium	U	0.98	U	0.78	U	0.77	U	0.89	U	0.92	U	0.71	U	0.64
Calcium	42000	33	52000	26	35000	26	49000	30	32000	31	23000	24	58000	21
Chromium	2.3	1.6	2.8	1.3	2.4	1.3	U	1.5	2.1	1.5	1.6	1.2	2.1	1.1
Cobalt	U	1.6	U	1.3	U	1.3	U	1.5	U	1.5	U	1.2	U	1.1
Copper	7.2	1.6	6.6	1.3	6.3	1.3	7.2	1.5	8.4	1.5	11	1.2	7.0	1.1
Iron	290	8.1	260	6.5	260	6.4	290	7.4	240	7.7	350	5.9	240	5.3
Lead	U	0.65	2.9	0.52	U	0.51	U	0.59	U	0.61	U	0.47	U	0.43
Magnesium	1800	160	1800	130	1400	130	1700	150	1400	150	1400	120	2000	110
Manganese	6.3	0.65	4.3	0.52	6.5	0.51	6.0	0.59	6.2	0.61	13	0.47	8.4	0.43
Mercury	U	0.17	U	0.17	U	0.10	U	0.14	U	0.14	U	0.10	U	0.10
Nickel	U	3.3	U	2.6	U	2.6	U	3.0	U	3.1	U	2.4	U	2.1
Potassium	10000	650	11000	520	9400	510	11000	590	9900	610	10000	470	11000	430
Selenium	U	0.65	U	0.52	U	0.51	U	0.59	U	0.61	0.61	0.47	U	0.43
Silver	U	1.6	U	1.3	U	1.3	U	1.5	U	1.5	U	1.2	U	1.1
Sodium	4500	160	4800	130	3700	130	4100	150	3800	150	4100	120	5100	110
Thallium	U	0.65	U	0.52	U	0.51	U	0.59	U	0.61	U	0.47	U	0.43
Vanadium	U	1.6	U	1.3	U	1.3	U	1.5	U	1.5	U	1.2	U	1.1
Zinc	94	1.6	100	1.3	85	1.3	110	1.5	90	1.5	110	1.2	110	1.1

MDL denotes Method Detection Limit
U denotes less than the MDL (not detected)

Table 39 (cont'd) Results of the Metals Analysis in Small Mammal Tissue
Avtex Fibers Site
Front Royal, VA
February 1999
Fly Ash Pile

Client ID	11-215-00206		11-215-00207		11-215-00217		11-215-00218		11-215-00219	
Location	FA-10-8		FA-10-10		FA-10-8		FA-10-9		FA-10-8	
% Solids	31		24		27		32		34	
Species	Microtus		Microtus		Microtus		Microtus		Microtus	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	120	14	100	16	260	15	250	13	98	12
Antimony	U	0 55	U	0 66	U	0 59	U	0 51	U	0 48
Arsenic	U	0 55	0.72	0 66	1 1	0 59	0 87	0 51	U	0 48
Barium	38	0 82	15	0 99	38	0 89	24	0 77	14	0 72
Beryllium	U	0 55	U	0.66	U	0 59	U	0 51	U	0 48
Cadmium	U	0 82	U	0 99	U	0 89	U	0 77	U	0 72
Calcium	33000	27	45000	33	39000	30	22000	26	17000	24
Chromium	3 1	1 4	3 3	1 6	3 1	1 5	1 6	1 3	U	1.2
Cobalt	U	1 4	U	1 6	U	1 5	U	1 3	U	1.2
Copper	8 4	1 4	8 6	1 6	11	1 5	6.5	1 3	6 5	1 2
Iron	370	6 8	300	8 2	520	7 4	490	6.4	260	6
Lead	U	0 55	U	0 66	U	0 59	U	0 51	U	0.48
Magnesium	1400	140	1900	160	1600	150	1100	130	960	120
Manganese	4 5	0 55	6 4	0 66	7 7	0 59	9 9	0 51	7 0	0.48
Mercury	U	0 11	U	0 18	U	0 15	U	0 14	U	0.09
Nickel	U	2 7	U	3 3	U	3	U	2 6	U	2 4
Potassium	9400	550	13000	660	11000	590	8100	510	7200	480
Selenium	4 9	0 55	3.9	0 66	3 3	0 59	2 2	0 51	3 1	0.48
Silver	U	1 4	U	1 6	U	1 5	U	1 3	U	1 2
Sodium	3600	140	4200	160	4000	150	3700	130	3100	120
Thallium	U	0 55	U	0.66	U	0.59	U	0 51	U	0 48
Vanadium	U	1 4	U	1 6	2 2	1 5	1 7	1 3	U	1 2
Zinc	95	1 4	100	1 6	120	1 5	74	1 3	67	1.2

Client ID	11-215-00222		11-215-00223		11-215-00227		11-215-00228		11-215-00230	
Location	FA-11-21		FA-10-9		FA-10-10		FA-11-2		FA-10-18	
% Solids	24		29		28		26		26	
Species	Microtus		Microtus		Microtus		Microtus		Microtus	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	26	14	180	12	240	11	170	16	440	16
Antimony	U	0 55	U	0 50	U	0 45	U	0 66	U	0 64
Arsenic	U	0 55	0.97	0 50	0 83	0 45	U	0 66	0.99	0 64
Barium	13	0 82	33	0 74	36	0 68	19	0 99	25	0 96
Beryllium	U	0 55	U	0 50	U	0 45	U	0.66	U	0 64
Cadmium	U	0 82	U	0 74	U	0.68	U	0 99	U	0 96
Calcium	18000	27	25000	25	38000	23	26000	33	35000	32
Chromium	1.5	1.4	2 1	1.2	3.1	1 1	2 6	1 6	3.4	1 6
Cobalt	U	1 4	U	1 2	U	1 1	U	1.6	U	1 6
Copper	12	1 4	11	1.2	7.9	1 1	8.7	1 6	22	1 6
Iron	300	6 8	380	6.2	620	5.6	450	8.2	1100	8
Lead	U	0 55	U	0 50	U	0.45	U	0 66	U	0.64
Magnesium	1400	140	1300	120	1600	110	1600	160	1900	160
Manganese	11	0 55	7 5	0.50	7.2	0 45	8 3	0 66	12	0.64
Mercury	U	0.14	U	0.11	U	0.12	U	0.15	U	0.14
Nickel	U	2.7	U	2.5	U	2.3	U	3.3	U	3 2
Potassium	13000	550	11000	500	11000	450	13000	660	13000	640
Selenium	5 9	0 55	2 9	0.50	2.9	0.45	4.2	0.66	4.9	0 64
Silver	U	1 4	U	1.2	U	1 1	U	1 6	U	1.6
Sodium	4100	140	3300	120	4200	110	3600	160	4000	160
Thallium	U	0.55	U	0.50	U	0.45	U	0.66	U	0.64
Vanadium	U	1 4	1.4	1 2	1.2	1.1	U	1 6	1.7	1 6
Zinc	93	1.4	96	1.2	100	1.1	100	1.6	100	1.6

MDL denotes Method Detection Limit
U denotes less than the MDL (not detected)

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Table 39 (cont'd) Results of the Metals Analysis in Small Mammal Tissue
Avtex Fibers Site
Front Royal, VA
February 1999
Wetland Area

Client ID	11-215-00204		11-215-00208		11-215-00235		11-215-00236	
Location	WA-2-2		WA-A 50		WA-NORTH-20		WA-SOUTH-17	
% Solids	30		29		35		29	
Species	Peromyscus		Blarina		Peromyscus		Peromyscus	
Parameter	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	47	14	91	11	58	13	76	14
Antimony	U	0 57	U	0 45	U	0 50	U	0 55
Arsenic	U	0 57	0 59	0 45	U	0 50	U	0 55
Barium	5	0 86	4 1	0 68	7 5	0 76	9.1	0.82
Beryllium	U	0 57	U	0 45	U	0 50	U	0.55
Cadmium	U	0 86	0 96	0 68	U	0 76	U	0 82
Calcium	12000	29	29000	23	23000	25	29000	27
Chromium	2 5	1 4	1 5	1 1	U	1 3	1 6	1 4
Cobalt	U	1 4	U	1 1	U	1 3	U	1 4
Copper	13	1 4	11	1 1	7 6	1 3	10	1 4
Iron	250	7 1	440	5 7	230	6 3	280	6 8
Lead	U	0 57	5.6	0 45	14	0 50	U	0 55
Magnesiu	1100	140	1000	110	1100	130	1300	140
Manganese	12	0 57	11	0.45	6 6	0.50	12	0 55
Mercury	U	0 12	0 24	0 1	0.08	0.08	U	0.15
Nickel	U	2.9	U	2.3	U	2 5	U	2.7
Potassium	9100	570	8700	450	7800	500	9900	550
Selenium	1 6	0 57	3 8	0 45	1 2	0 50	1.1	0 55
Silver	U	1.4	U	1 1	U	1 3	U	1.4
Sodium	4000	140	4500	110	3700	130	4300	140
Thallium	U	0 57	U	0 45	U	0 50	U	0 55
Vanadium	U	1 4	U	1 1	U	1 3	U	1 4
Zinc	92	1.4	130	1 1	93	1 3	120	1.4

MDL denotes Method Detection Limit
U denotes less than the MDL (not detected)

Table 40 Summary of Results of the Analysis of Metals and PCBs in Mammals
Avtex Fibers Site
Front Royal, VA
February 1999

Location Solids		Reference 28		Treatment Plant 28		Fly Ash Pile 28		Wetland Area 31	
Parameter		Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg	Dry Weight mg/kg	Wet Weight mg/kg
Arsenic	Mean	0.36	0.1	*0.27*	*0.076*	0.66	0.19	0.35	0.11
	Max	0.55	0.15	*0.33*	*0.092*	1.1	0.31	0.59	0.18
Cadmium	Mean	0.64	0.18	*0.41*	*0.12*	*0.42*	*0.12*	0.55	0.17
	Max	1.6	0.45	*0.49*	*0.14*	*0.5*	*0.14*	0.96	0.3
Chromium	Mean	2.2	0.62	2	0.56	2.4	0.67	1.6	0.5
	Max	4	1.1	2.8	0.78	3.4	0.95	2.5	0.78
Copper	Mean	11	3.1	7.7	2.2	10	2.8	10	3.0
	Max	20	5.6	11	3.1	22	6.2	13	4.0
Lead	Mean	2.1	0.59	0.65	0.18	*0.28*	*0.078*	5.0	1.60
	Max	10	2.8	2.9	0.81	*0.33*	*0.092*	14	4.0
Mercury	Mean	0.17	0.048	*0.066*	*0.019*	*0.07*	*0.02*	0.11	0.034
	Max	0.27	0.076	*0.085*	*0.024*	*0.09*	*0.025*	0.2	0.074
Nickel	Mean	*1.4*	*0.39*	*1.4*	*0.39*	*1.4*	*0.39*	*1.3*	*0.4*
	Max	*2.7*	*0.76*	*1.7*	*0.48*	*1.7*	*0.47*	*1.5*	*0.47*
Zinc	Mean	120	34	100	28	95	27	110	34
	Max	240	67	110	31	120	34	130	40
PCBs	Mean	0.071	0.02	0.20	0.056	0.14	0.039	1.8	0.56
	Max	0.23	0.064	0.75	0.21	0.92	0.260	6.5	2.0

Values in italics were not detected
mg/kg - milligram per kilogram
PCBs - Total of Aroclor 1254 and 1260

Table 41 Results of the Analysis for Pesticides/PCBs in Tissue
Avtex Fibers Site
Front Royal, VA
February 1999
Reference Area (Page 1)

Client ID	11-215-00202		11-215-00203		11-215-00209		11-215-00210		11-215-00211		11-215-00212		11-215-00213		11-215-00214		11-215-00215	
Location	Ref -5-19		Ref -2-11		Ref -6-1		Ref -6-7		Ref -5-18		Ref -2-10		Ref -3-10		Ref -1-17		Ref -4-17	
Percent Solid	30		26		30		29		25		25		31		32		26	
Species	*Blarina*		*Microtus*		*Blarina*		*Blarina*		*Microtus*		*Microtus*		*Blarina*		*Blarina*		*Blarina*	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
a-BHC	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
g-BHC	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
b-BHC	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Heptachlor	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
d-BHC	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Aldrin	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Heptachlor Epoxide	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
g-Chlordane	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
a-Chlordane	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Endosulfan (I)	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
p,p'-D D E	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Dieldrin	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Endrin	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
p,p'-D D D	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Endosulfan (II)	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
p,p'-D D T	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Endrin Aldehyde	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Endosulfan Sulfate	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Methoxychlor	U	13	U	15	U	13	U	14	U	16	U	16	U	13	U	12	U	15
Endrin Ketone	U	13	U	15	U	13	3 6	14	U	16	U	16	U	13	3 2	12	U	15
Toxaphene	U	130	U	150	U	130	U	140	U	160	U	160	U	130	U	120	U	150
Aroclor 1016	U	65	U	73	U	67	U	68	U	78	U	79	U	64	U	61	U	76
Aroclor 1221	U	130	U	150	U	130	U	140	U	160	U	160	U	130	U	120	U	150
Aroclor 1232	U	65	U	73	U	67	U	68	U	78	U	79	U	64	U	61	U	76
Aroclor 1242	U	65	U	73	U	67	U	68	U	78	U	79	U	64	U	61	U	76
Aroclor 1248	U	65	U	73	U	67	U	68	U	78	U	79	U	64	U	61	U	76
Aroclor 1254	U	65	U	73	U	67	U	68	U	78	U	79	95 W	64	U	61	U	76
Aroclor 1260	18 W	65	12 W	73	210 W	67	76 W	68	U	78	U	79	100 W	64	U	61	140 W	76

MDL denotes Method Detection Limit
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W denotes the compound is weathered

Table 41 (cont'd) Results of the Analysis for Pesticides/PCBs in Tissue
Avtex Fibers Site
Front Royal, VA
February 1999
Reference Area (Page 2)

Client ID	11-215-00216		11-215-00220		11-215-00221		11-215-00224		11-215-00225		11-215-00226		11-215-00229		11-215-00234	
Location	Ref-5-9		Ref-1-8		Ref-1-17		Ref-5-20		Ref-5-19		Ref-2-12		Ref-6-10		Ref-6-9	
Percent Solid	29		28		25		27		30		26		30		24	
Species	*Blarina*		*Blarina*		*Microtus*		*Microtus*		*Blarina*		*Microtus*		*Blarina*		*Microtus*	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
a-BHC	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
g-BHC	U	14	U	14	U	17	U	15	U	16	U	18	U	12	2 8	16
b-BHC	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
Heptachlor	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
d-BHC	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
Aldrin	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
Heptachlor Epoxide	4 4	14	U	14	U	17	U	15	3 4	16	U	18	U	12	U	16
g-Chlordane	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
a-Chlordane	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
Endosulfan (I)	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
p,p'-D D E	U	14	8 9	14	U	17	U	15	9 4	16	U	18	U	12	U	16
Dieldrin	U	14	U	14	U	17	U	15	2 6	16	U	18	27	12	U	16
Endrin	U	14	U	14	U	17	U	15	U	16	U	18	8 4	12	U	16
p,p'-D D D	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
Endosulfan (II)	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
p,p'-D D T	U	14	4 2	14	U	17	U	15	U	16	U	18	U	12	U	16
Endrin Aldehyde	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
Endosulfan Sulfate	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
Methoxychlor	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
Endrin Ketone	U	14	U	14	U	17	U	15	U	16	U	18	U	12	U	16
Toxaphene	U	140	U	140	U	170	U	150	U	160	U	180	U	120	U	160
Aroclor 1016	U	68	U	70	U	84	U	74	U	82	U	89	U	62	U	80
Aroclor 1221	U	140	U	140	U	170	U	150	U	160	U	180	U	120	U	160
Aroclor 1232	U	68	U	70	U	84	U	74	U	82	U	89	U	62	U	80
Aroclor 1242	U	68	U	70	U	84	U	74	U	82	U	89	U	62	U	80
Aroclor 1248	U	68	U	70	U	84	U	74	U	82	U	89	U	62	U	80
Aroclor 1254	U	68	U	70	U	84	U	74	U	82	U	89	U	62	U	80
Aroclor 1260	83 W	68	U	70	U	84	U	74	72 W	82	U	89	220 W	62	U	80

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Table 41 (cont'd.) Results of the Analysis for Pesticides/PCBs in Tissue
Avtex Fibers Site
Front Royal, VA
February 1999
Treatment Plant

Client ID	11-215-00201		11-215-00205		11-215-00231		11-215-00232		11-215-00233		11-215-00237		11-215-00238	
Location	TP-6-9		TP-3-19		TP-1 2		TP-3-1		TP-2-2		TP-4A-8 (22 5c)		TP-7-5 (34 8 g)	
Percent Solid	27		27		30		30		28		27		28	
Species	*Microtus*		*Microtus*		*Microtus*		*Microtus*		*Microtus*		*Peromyscus*			
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
a-BHC	U	15	U	15	U	13	U	13	U	14	U	15	U	16
g-BHC	U	15	U	15	U	13	U	13	U	14	U	15	U	16
b-BHC	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Heptachlor	U	15	U	15	U	13	U	13	U	14	U	15	U	16
d-BHC	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Aldrin	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Heptachlor Epoxide	U	15	U	15	U	13	U	13	U	14	U	15	U	16
g-Chlordane	U	15	U	15	U	13	U	13	U	14	U	15	U	16
a-Chlordane	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Endosulfan (I)	U	15	U	15	U	13	U	13	U	14	U	15	U	16
p,p'-D D E	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Dieldrin	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Endrin	U	15	U	15	U	13	U	13	U	14	U	15	U	16
p,p'-D D D	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Endosulfan (II)	U	15	U	15	U	13	U	13	U	14	U	15	U	16
p,p'-D D T	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Endrin Aldehyde	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Endosulfan Sulfate	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Methoxychlor	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Endrin Ketone	U	15	U	15	U	13	U	13	U	14	U	15	U	16
Toxaphene	U	150	U	150	U	130	U	130	U	140	U	150	U	160
Aroclor 1016	U	73	U	74	U	65	U	65	U	71	U	73	U	79
Aroclor 1221	U	150	U	150	U	130	U	130	U	140	U	150	U	160
Aroclor 1232	U	73	U	74	U	65	U	65	U	71	U	73	U	79
Aroclor 1242	U	73	U	74	U	65	U	65	U	71	U	73	U	79
Aroclor 1248	U	73	U	74	U	65	U	65	U	71	U	73	U	79
Aroclor 1254	U	73	U	74	U	65	U	65	U	71	U	73	U	79
Aroclor 1260	25 W	73	180 W	74	46 W	65	110 W	65	180 W	71	740 W	73	32 W	79

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Table 41 (cont'd) Results of the Analysis for Pesticides/PCBs in Tissue
Avtex Fibers Site
Front Royal, VA
February 1999
Fly Ash Pile

Client ID	11-215-00206		11-215-00207		11-215-00217		11-215-00218		11-215-00219		11-215-00222		11-215-00223		11-215-00227		11-215-00228		11-215-00230	
Location	FA-10-8		FA-10-10		FA-10-8		FA-10-9		FA-10-8		FA-11-21		FA-10-9		FA-10-10		FA-11-12		FA-10-18	
Percent Solid	31		24		27		32		34		24		29		28		26		26	
Species	*Microtus*		*Microtus*		*Microtus*		*Microtus*		*Microtus*		*Microtus*		*Microtus*		*Microtus*		*Microtus*		*Microtus*	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
a-BHC	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	4 5	15
g-BHC	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
b-BHC	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
Heptachlor	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
d-BHC	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
Aldrin	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
Heptachlor Epoxide	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
g-Chlordane	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
a-Chlordane	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
Endosulfan (I)	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
p,p'-D D E	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
Dieldrin	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
Endrin	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
p,p'-D D D	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
Endosulfan (II)	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
p,p'-D D T	U	13	U	17	U	15	U	12	U	12	6 2	16	U	14	U	14	U	15	U	15
Endrin Aldehyde	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
Endosulfan Sulfate	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
Methoxychlor	U	13	U	17	U	15	U	12	U	12	U	16	U	14	U	14	U	15	U	15
Endrin Ketone	U	13	U	17	U	15	U	12	1 0	12	U	16	U	14	U	14	U	15	U	15
Toxaphene	U	130	U	170	U	150	U	120	U	120	U	160	U	140	U	140	U	150	U	150
Aroclor 1016	U	63	U	83	U	74	U	61	U	59	U	81	U	68	U	71	U	75	U	76
Aroclor 1221	U	130	U	170	U	150	U	120	U	120	U	160	U	140	U	140	U	150	U	150
Aroclor 1232	U	63	U	83	U	74	U	61	U	59	U	81	U	68	U	71	U	75	U	76
Aroclor 1242	U	63	U	83	U	74	U	61	U	59	U	81	U	68	U	71	U	75	U	76
Aroclor 1248	U	63	U	83	U	74	U	61	U	59	U	81	U	68	U	71	U	75	U	76
Aroclor 1254	U	63	U	83	U	74	U	61	U	59	U	81	U	68	U	71	U	75	U	76
Aroclor 1260	40 W	63	57 W	83	U	74	U	61	U	59	910 W	81	U	68	U	71	250 W	75	U	76

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Table 41 (cont'd) Results of the Analysis for Pesticides/PCBs in Tissue
Avtex Fibers Site
Front Royal, VA
February 1999
Wetland Area

Client ID	11-215-00204		11-215-00208		11-215-00235		11-215-00236	
Location	WA-[illegible]		WA-A-50		WA-North-20		WA-South-17	
Percent Solid	30		29		35		29	
Species	*Peromyscus*		*Blarina*		*Peromyscus*		*Peromyscus*	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
a-BHC	U	30	U	14	U	11	U	14
g-BHC	U	30	U	14	U	11	U	14
b-BHC	U	30	U	14	U	11	U	14
Heptachlor	U	30	U	14	U	11	U	14
d-BHC	U	30	U	14	U	11	U	14
Aldrin	U	30	U	14	U	11	U	14
Heptachlor Epoxide	U	30	U	14	U	11	U	14
g-Chlordane	U	30	U	14	U	11	U	14
a-Chlordane	U	30	U	14	U	11	U	14
Endosulfan (I)	U	30	U	14	U	11	U	14
p,p'-D D E	U	30	U	14	U	11	U	14
Dieldrin	U	30	U	14	U	11	U	14
Endrin	U	30	U	14	U	11	U	14
p,p'-D D D	U	30	U	14	U	11	U	14
Endosulfan (II)	U	30	U	14	U	11	U	14
p,p'-D D T	U	30	U	14	U	11	U	14
Endrin Aldehyde	U	30	U	14	U	11	U	14
Endosulfan Sulfate	U	30	U	14	U	11	U	14
Methoxychlor	U	30	U	14	U	11	U	14
Endrin Ketone	U	30	U	14	J 22	11	U	14
Toxaphene	U	300	U	140	U	110	U	140
Aroclor 1016	U	150	U	68	U	55	U	68
Aroclor 1221	U	300	U	140	U	110	U	140
Aroclor 1232	U	150	U	68	U	55	U	68
Aroclor 1242	U	150	U	68	U	55	U	68
Aroclor 1248	U	150	U	68	U	55	U	68
Aroclor 1254	U	150	U	68	180 W	55	46 W	68
Aroclor 1260	160 W	150	530 W	68	6300 W	55	28 W	68

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Table 42 Benthic Macroinvertebrates Collected from the South Fork of the Shenandoah River
Avtex Fibers Site
Front Royal, VA
February 1999

Class	Order	Family	Genus	Functional Group	Hilsenhoff Rating	Reference No 2			BMI-1 (Outfall 01)			BMI-2 (Outfall 02)			BMI-3 (Outfall 03)			BMI-4 (Outfall 04)			BMI-5 (Outfall 05)			BMI-6 (Downstream)		
						A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Oligochaeta					8	4	1			2										8	6	6	1	1	4	
Crustacea	Amphipoda	Gammaridae	*Gammarus*	Shredder	4																					
	Isopoda	Asellidae	*Caecidotea*	Shredder	8									1												
Mollusca	Bivalvia	Sphaeriidae	*Pisidium*	Filterer	8	2		1							1											
		Corbicullidae	*Corbicula*	Filterer	8		1			3	9	2	1	2					1	1		2	4		2	1
	Gastropoda	Physidae		Scraper	6					2	5				1					2	3	3	2		2	7
		Lymnaeidae		Scraper	6																				1	
		Ancylidae		Scraper	6					1																
Insecta	Ephemeroptera	Heptageniidae	*Stenoma*	Scraper	4	10	10	11	13	12	21	5	2	8	2	13	23	9	5	22	47	50	35	29	51	26
		Isonychiidae	*Isonychia*	Filterer	2	10	10	11	5	5	8	2	3	3	1	1	3	15	23	9	11	10	6	28	11	3
		Baetidae	*Acentrelia*	Gatherer	4	15	5	14	15	22	43	1	1	8		5	1	3	3	6	4	15	10	7	9	31
			Baetis	Scraper	4	123	68	86	41	25	46	73	36	104	37	48	8	32	8	13	64	68	75	87	37	47
		Leptophebiidae		Shredder	2	2																				
		Ephemerellidae	*Ephemerella*	Scraper	1	1		5	4	4	12	1	8	7	2	2		7	5	16	2	1	1	1	4	7
			Drunella	Scraper	0	14	2	3	5	6	5	2	4	15	1	1	3	3	7	1	1	1		5	2	9
			Serratella	Gatherer	2	49	29	22	19	35	105	3	6	43		25	9	25	21	41	12	14	13	25	39	37
		Potamanthidae	*Potamanthus*	Filterer	4	30	7	6	31	30	36	24	12	47	5	13	41	10	21	63	17	17	36	26	48	33
		Caenidae	*Caenis*	Scraper	7						1										1	1			1	
	Plecoptera	Perlodidae	*Isoperla*	Predator	2	1			1										1							
			Agnetina	Predator	2	5	4	6	4			4	2	3	2			2	6	7				7	3	6
			Perlesta	Predator	5	17	33	17	16	34	77	9	12	71	11	17	23	34	54	104	17	10	19	32	28	34
			Eccoptura	Predator	1	1		1														1				
		Pteronarcyidae	*Pteronarcys*	Shredder	0		3	1	2	1	1	1	1	2	1				1	3			1		3	1
	Trichoptera	Hydropsychidae	*Hydropsyche*	Filterer	4	11	4	2	6	13	23	1	4	10	1	2	8	3	11	19	3	2		3	7	9
			Cheumatopsyche	Filterer	4		1		2	4	5			2			1		1							1
		Uenoidae	*Neophylax*	Scraper	0									1												
		Lepidostomatidae	*Lepidostoma*	Shredder	1				1		2				2										1	
		Hydroptilidae	*Hydroptila*	Scraper	6	1				1																
		Phryganeidae	*Phryganea*	Shredder	8	3	1			14	75				49	85	16	10	8	25	12	71	17	19	75	105
		Leptoceridae	*Setodes*	Gatherer	4					2		1				1									1	
			Nectopsyche	Shredder	3					1	2										1			1		1
			Oecitis	Predator	8												2									
	Diptera	Empididae	*Hemerodromia*	Predator	6				2		1	1	4			1		2				1				
		Chironomidae		Scraper	6	181	100	205	256	421	719	98	218	12	368	232	327	166	84	388	199	302	361	160	389	610
		Simulidae	*Simulium*	Filterer	6		1	1										3			2	2	1			
		Ceratopogonidae	*Sphaeromis*	Predator	6					1																
			Probezzia	Predator	6												1									
	Coleoptera	Elmidae	*Stenelmis*	Scraper	5	19	14	13	15	25	42	4	5	5	3	4	1	24	12	64	31	25	9	9	22	16
			Optioservus	Scraper	4				1		1	3	1	1				3	1	1						2
			Microcylloepus	Scraper	3					3	2															
			Macronychus	Scraper	4					1																
			Dubiraphia	Scraper	6					1							1			1		1				
		Psepheridae	*Psephenus*	Scraper	4																2					
		Hydrophilidae	*Berosus*	Predator	0					1								1				1				
	Odonata	Gomphidae	*Stylogomphus*	Predator	0				1		2															
			Gomphus	Predator	5					1				1					2		3	1				
			Ophiogomphus	Predator	1									1												
		Coenagrionidae	*Argia*	Predator	2	1																				
		Macromiidae	*Macromia*	Predator	7									1												
	Lepidoptera			Shredder	5																1	2				
	Megaloptera	Corydalidae	*Corydalus*	Predator	6			1		1			1							2						1
			Neohermes	Predator	0																1					

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Table 43 Community Metrices for Benthic Macroinvertebrates
Avtex Fibers Site
Front Royal, VA
February 1999

	Reference No 2			BMI-1 Outfall 01			BMI-2 Outfall 02			BMI-3 Outfall 03			BMI-4 Outfall 04			BMI-5 Outfall 05			BMI-6 Downstream		
Metric	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Total No of Organisms	500	294	406	440	672	1243	236	322	348	487	450	468	352	275	798	440	607	591	440	740	987
Number of Taxa	21	18	18	20	29	24	19	19	22	16	15	16	18	20	23	22	24	16	16	22	21
Functional Feeding Group																					
Scrapers	349	194	323	335	502	854	186	274	153	414	300	363	244	122	509	350	452	483	291	509	724
Filterers	53	24	21	44	55	81	29	20	64	8	16	53	31	57	93	33	33	47	57	68	47
Shredders (CPOM only)																					
Scrapers:Filterers	6 58	8 08	15 38	7.61	9.13	10 54	6 41	13 7	2 39	51 75	18 75	6.85	7.87	2.14	5 47	10.61	13.7	10 28	5.11	7.49	15.4
Shredders/Total (CPOM only)																					
EPT Abundance	293	177	185	165	209	462	127	91	324	114	213	138	153	175	331	192	261	213	270	320	350
Chironomid Abundance	181	100	205	256	421	719	98	218	12	368	232	327	166	84	388	199	302	361	160	389	610
EPT Chironomid	1 62	1 77	0 9	0.64	0 5	0.64	1 3	0.42	27	0,31	0.92	0,42	0,92	2.08	0.85	0.96	0 86	0.59	1.69	0.82	0.87
% Contribution Dominant Family	36.2	34.01	50 49	58 18	62 65	57 84	41 53	67.7	29.89	75 56	51.56	69 87	47.16	30.55	48 62	45.23	49 75	61 08	36 36	52 57	61.8
EPT Index	16	13	13	15	16	16	13	12	14	12	12	12	12	15	15	13	13	10	13	16	15
H' Diversity	2.02	2 01	1.7	1 69	1.66	1,71	1.7	1 36	2.15	0.97	1.58	1.24	1.96	2.26	1.89	1.95	1.83	1.47	2.04	1.81	1.56
Hilsenhoff's Biotic Index	4.5	4.5	4.8	5	5.3	5.3	4.8	5.3	3.8	5.9	5.7	5.5	4.9	4.4	5.1	5.1	5.5	5.4	4.7	5.4	5.6

Table 44 Community Bioassessment of Benthic Macroinvertebrates
Avtex Fibers Site
Front Royal, VA
February 1999

Metric	Reference No 2	BMI-1 Outfall 01	BMI-2 Outfall 02	BMI-3 Outfall 03	BMI-4 Outfall 04	BMI-5 Outfall 05	BMI-6 Downstream
Total No of Organisms	400	785	302	468	475	546	722
Number of Taxa	19	24 3	20	15.7	20 3	20.7	19.7
Functional Feeding Group							
Scrapers	288.7	563.7	204.3	359	291 7	428.3	508
Filterers	32 7	60	37.7	25.7	60.3	37.7	57.3
Shredders (CPOM only)							
Scrapers:Filterers	10	9.1	7.5	25.8	5.2	11 5	9.3
Shredders/Total (CPOM only)							
EPT Abundance	218.3	278.7	180.7	155	219.7	222	313 3
Chironomid Abundance	162	465.3	109.3	3.9	212.7	287.3	386.3
EPT:Chironomid	1 4	0 6	9 6	0.5	1.3	0.8	1
% Contribution Dominant Taxon	40.2	59.6	46.4	65.7	42.1	52	50.2
EPT Index	14	15.7	13	12	14	12	14.7
H' Diversity	1.9	1.7	1.7	1 3	2	1.8	1 8
Hilsenhoff's Biotic Index	4 6	5.2	4.6	5.7	4.8	5.3	5.2
Community Loss Index	NA	0 14	0.35	0.38	0.19	0.29	0.27
Biological Condition Score	36	32	36	28	36	32	34
Biological Condition Category		Not Impaired	Not Impaired	Slightly Impaired	Not Impaired	Not Impaired	Not Impaired

Table 45. LOAEL and NOAEL Values for Each Receptor Species
Avtex Fibers Site
Front Royal, VA
February 1999

		Belted kingfisher	American woodcock	Red-tailed hawk	Red fox	Mink	Smallmouth bass	Raccoon
Arsenic	LOAEL	3.3	3.3	3.3	1.5	1.5	NA	1.5
	NOAEL	0.33	0.33	0.33	0.15	0.15	NA	0.15
Cadmium	LOAEL	3.31	3.31	3.31	7.5	7.5	NA	7.5
	NOAEL	0.33	0.33	0.33	0.75	0.75	NA	0.75
Chromium	LOAEL	277.8	277.8	277.8	1.7	1.7	0.12	1.7
	NOAEL	27.8	27.8	27.8	0.17	0.17	0.012	0.17
Copper	LOAEL	2.35	2.35	2.35	10	10	NA	10
	NOAEL	0.235	0.235	0.235	1	1	NA	1
Lead	LOAEL	3	3	3	1.5	1.5	NA	1.5
	NOAEL	0.3	0.3	0.3	0.15	0.15	NA	0.15
Mercury	LOAEL	0.1	0.12	0.1	0.1	0.27	0.94	0.1
	NOAEL	0.01	0.012	0.01	0.01	0.027	0.094	0.01
Nickel	LOAEL	NA	NA	NA	625	625	NA	625
	NOAEL	NA	NA	NA	62.5	62.5	NA	62.5
Zinc	LOAEL	139	139	139	250	250	NA	250
	NOAEL	13.9	13.9	13.9	25	25	NA	25
PCBs	LOAEL	0.9	0.9	9	0.13	0.13	0.071	0.13
	NOAEL	0.09	0.09	0.9	0.1	0.1	0.007	0.1

All values in mg/kg BW/day

Table 46. Summary of Exposure Profile Information Used in the Hazard Quotient Calculations
Avtex Fibers Site
Front Royal, VA
February 1999

	Body Weight (kg)	Ingestion Rate (kg/day)	Sediment Ingestion Rate (kg/day)	Water Ingestion (L/day)	Diet (Percent)
Belted kingfisher	0.113	0.06	0.0001	0.012	100% Fish
American woodcock	0.165	0.083	0.0075	NA	100% Worms
Red-tailed hawk	0.96	0.4	0.0028	0.057	100% Small mammals
Red fox	2.7	0.432	0.012	0.23	100% Small mammals
Mink	0.52	0.114	0.0002	0.057	100% Fish
Smallmouth bass	2.2	0.143	0.014	NA	100% Fish
Raccoon	2.0	0.5	0.047	0.18	80% Fish, 20% Clams

kg - kilograms
kg/day - kilograms per day
L/day - Liters per day

Table 47. Hazard Quotient Calculations for Smallmouth Bass
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Mean Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate	AUF	Body Weight (1/2.2 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.062	0.143	0.014	1.0	0.45	0.033	NA	ERR
	Outfall 001 (BMI-1)	3.30	0.086	0.143	0.014	1.0	0.45	0.052	NA	ERR
	Outfall 002 (BMI-2)	1.80	0.078	0.143	0.014	1.0	0.45	0.030	NA	ERR
	Outfall 004 (BMI-4)	2.80	0.078	0.143	0.014	1.0	0.45	0.044	NA	ERR
	Downstream (BMI-6)	0.94	0.070	0.143	0.014	1.0	0.45	0.018	NA	ERR
Cadmium	Reference No. 2	0.11	0.09	0.143	0.014	1.0	0.45	0.007	NA	ERR
	Outfall 001 (BMI-1)	0.18	0.12	0.143	0.014	1.0	0.45	0.010	NA	ERR
	Outfall 002 (BMI-2)	0.17	0.12	0.143	0.014	1.0	0.45	0.010	NA	ERR
	Outfall 004 (BMI-4)	0.12	0.12	0.143	0.014	1.0	0.45	0.009	NA	ERR
	Downstream (BMI-6)	0.16	0.12	0.143	0.014	1.0	0.45	0.010	NA	ERR
Chromium	Reference No. 2	13.00	0.39	0.143	0.014	1.0	0.45	0.107	0.012	8.9
	Outfall 001 (BMI-1)	8.30	0.35	0.143	0.014	1.0	0.45	0.075	0.012	6.2
	Outfall 002 (BMI-2)	7.90	0.35	0.143	0.014	1.0	0.45	0.072	0.012	6.0
	Outfall 004 (BMI-4)	11.50	0.36	0.143	0.014	1.0	0.45	0.096	0.012	8.0
	Downstream (BMI-6)	6.90	0.34	0.143	0.014	1.0	0.45	0.065	0.012	5.4
Copper	Reference No. 2	12.30	0.45	0.143	0.014	1.0	0.45	0.106	NA	ERR
	Outfall 001 (BMI-1)	5.50	1.10	0.143	0.014	1.0	0.45	0.105	NA	ERR
	Outfall 002 (BMI-2)	4.80	0.73	0.143	0.014	1.0	0.45	0.077	NA	ERR
	Outfall 004 (BMI-4)	4.50	0.75	0.143	0.014	1.0	0.45	0.077	NA	ERR
	Downstream (BMI-6)	3.00	0.81	0.143	0.014	1.0	0.45	0.071	NA	ERR
Lead	Reference No. 2	12.30	0.07	0.143	0.014	1.0	0.45	0.082	NA	ERR
	Outfall 001 (BMI-1)	12.00	0.078	0.143	0.014	1.0	0.45	0.081	NA	ERR
	Outfall 002 (BMI-2)	7.30	0.078	0.143	0.014	1.0	0.45	0.051	NA	ERR
	Outfall 004 (BMI-4)	4.50	0.10	0.143	0.014	1.0	0.45	0.035	NA	ERR
	Downstream (BMI-6)	5.30	0.07	0.143	0.014	1.0	0.45	0.038	NA	ERR
Mercury	Reference No. 2	0.49	0.19	0.143	0.014	1.0	0.45	0.015	0.094	0.2
	Outfall 001 (BMI-1)	0.14	0.21	0.143	0.014	1.0	0.45	0.014	0.094	0.2
	Outfall 002 (BMI-2)	0.12	0.22	0.143	0.014	1.0	0.45	0.015	0.094	0.2
	Outfall 004 (BMI-4)	0.032	0.19	0.143	0.014	1.0	0.45	0.012	0.094	0.1
	Downstream (BMI-6)	0.05	0.19	0.143	0.014	1.0	0.45	0.013	0.094	0.1
Nickel	Reference No. 2	8.40	0.31	0.143	0.014	1.0	0.45	0.073	NA	ERR
	Outfall 001 (BMI-1)	4.90	0.38	0.143	0.014	1.0	0.45	0.055	NA	ERR
	Outfall 002 (BMI-2)	4.50	0.38	0.143	0.014	1.0	0.45	0.053	NA	ERR
	Outfall 004 (BMI-4)	4.20	0.39	0.143	0.014	1.0	0.45	0.052	NA	ERR
	Downstream (BMI-6)	3.60	0.36	0.143	0.014	1.0	0.45	0.046	NA	ERR
Zinc	Reference No. 2	44.00	19.00	0.143	0.014	1.0	0.45	1.500	NA	ERR
	Outfall 001 (BMI-1)	33.00	19.00	0.143	0.014	1.0	0.45	1.431	NA	ERR
	Outfall 002 (BMI-2)	30.00	19.00	0.143	0.014	1.0	0.45	1.412	NA	ERR
	Outfall 004 (BMI-4)	29.00	20.00	0.143	0.014	1.0	0.45	1.470	NA	ERR
	Downstream (BMI-6)	25.00	21.00	0.143	0.014	1.0	0.45	1.509	NA	ERR
PCBs (Total)	Reference No. 2	0.0083	0.076	0.143	0.014	1.0	0.45	0.005	0.007	0.7
	Outfall 001 (BMI-1)	0.0082	0.089	0.143	0.014	1.0	0.45	0.006	0.007	0.8
	Outfall 002 (BMI-2)	0.0083	0.21	0.143	0.014	1.0	0.45	0.014	0.007	1.9
	Outfall 004 (BMI-4)	0.0084	0.49	0.143	0.014	1.0	0.45	0.032	0.007	4.4
	Downstream (BMI-6)	0.0082	2.50	0.143	0.014	1.0	0.45	0.161	0.007	22.7

Notes.
1) All concentrations in mg/kg, wet weight
2) Fish tissue concentrations represent a mean value for all fish collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in fish represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample

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Table 47 (cont'd.). **Hazard Quotient Calculations for Smallmouth Bass**
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Mean Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate	AUF	Body Weight (1/2.2 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.062	0.143	0.014	1.0	0.45	0.033	NA	ERR
	Outfall 001 (BMI-1)	3.30	0.086	0.143	0.014	1.0	0.45	0.052	NA	ERR
	Outfall 002 (BMI-2)	1.80	0.078	0.143	0.014	1.0	0.45	0.030	NA	ERR
	Outfall 004 (BMI-4)	2.80	0.078	0.143	0.014	1.0	0.45	0.044	NA	ERR
	Downstream (BMI-6)	0.94	0.070	0.143	0.014	1.0	0.45	0.018	NA	ERR
Cadmium	Reference No. 2	0.11	0.09	0.143	0.014	1.0	0.45	0.007	NA	ERR
	Outfall 001 (BMI-1)	0.18	0.12	0.143	0.014	1.0	0.45	0.010	NA	ERR
	Outfall 002 (BMI-2)	0.17	0.12	0.143	0.014	1.0	0.45	0.010	NA	ERR
	Outfall 004 (BMI-4)	0.12	0.12	0.143	0.014	1.0	0.45	0.009	NA	ERR
	Downstream (BMI-6)	0.16	0.12	0.143	0.014	1.0	0.45	0.010	NA	ERR
Chromium	Reference No. 2	13.00	0.39	0.143	0.014	1.0	0.45	0.107	0.120	0.9
	Outfall 001 (BMI-1)	8.30	0.35	0.143	0.014	1.0	0.45	0.075	0.120	0.6
	Outfall 002 (BMI-2)	7.90	0.35	0.143	0.014	1.0	0.45	0.072	0.120	0.6
	Outfall 004 (BMI-4)	11.50	0.36	0.143	0.014	1.0	0.45	0.096	0.120	0.8
	Downstream (BMI-6)	6.90	0.34	0.143	0.014	1.0	0.45	0.065	0.120	0.5
Copper	Reference No. 2	12.30	0.45	0.143	0.014	1.0	0.45	0.106	NA	ERR
	Outfall 001 (BMI-1)	5.50	1.10	0.143	0.014	1.0	0.45	0.105	NA	ERR
	Outfall 002 (BMI-2)	4.80	0.73	0.143	0.014	1.0	0.45	0.077	NA	ERR
	Outfall 004 (BMI-4)	4.50	0.75	0.143	0.014	1.0	0.45	0.077	NA	ERR
	Downstream (BMI-6)	3.00	0.81	0.143	0.014	1.0	0.45	0.071	NA	ERR
Lead	Reference No. 2	12.30	0.07	0.143	0.014	1.0	0.45	0.082	NA	ERR
	Outfall 001 (BMI-1)	12.00	0.078	0.143	0.014	1.0	0.45	0.081	NA	ERR
	Outfall 002 (BMI-2)	7.30	0.078	0.143	0.014	1.0	0.45	0.051	NA	ERR
	Outfall 004 (BMI-4)	4.50	0.10	0.143	0.014	1.0	0.45	0.035	NA	ERR
	Downstream (BMI-6)	5.30	0.07	0.143	0.014	1.0	0.45	0.038	NA	ERR
Mercury	Reference No. 2	0.49	0.19	0.143	0.014	1.0	0.45	0.015	0.940	0.0
	Outfall 001 (BMI-1)	0.14	0.21	0.143	0.014	1.0	0.45	0.014	0.940	0.0
	Outfall 002 (BMI-2)	0.12	0.22	0.143	0.014	1.0	0.45	0.015	0.940	0.0
	Outfall 004 (BMI-4)	0.032	0.19	0.143	0.014	1.0	0.45	0.012	0.940	0.0
	Downstream (BMI-6)	0.05	0.19	0.143	0.014	1.0	0.45	0.013	0.940	0.0
Nickel	Reference No. 2	8.40	0.31	0.143	0.014	1.0	0.45	0.073	NA	ERR
	Outfall 001 (BMI-1)	4.90	0.38	0.143	0.014	1.0	0.45	0.055	NA	ERR
	Outfall 002 (BMI-2)	4.50	0.38	0.143	0.014	1.0	0.45	0.053	NA	ERR
	Outfall 004 (BMI-4)	4.20	0.39	0.143	0.014	1.0	0.45	0.052	NA	ERR
	Downstream (BMI-6)	3.60	0.36	0.143	0.014	1.0	0.45	0.046	NA	ERR
Zinc	Reference No. 2	44.00	19.00	0.143	0.014	1.0	0.45	1.500	NA	ERR
	Outfall 001 (BMI-1)	33.00	19.00	0.143	0.014	1.0	0.45	1.431	NA	ERR
	Outfall 002 (BMI-2)	30.00	19.00	0.143	0.014	1.0	0.45	1.412	NA	ERR
	Outfall 004 (BMI-4)	29.00	20.00	0.143	0.014	1.0	0.45	1.470	NA	ERR
	Downstream (BMI-6)	25.00	21.00	0.143	0.014	1.0	0.45	1.509	NA	ERR
PCBs (Total)	Reference No. 2	0.0083	0.076	0.143	0.014	1.0	0.45	0.005	0.071	0.1
	Outfall 001 (BMI-1)	0.0082	0.089	0.143	0.014	1.0	0.45	0.006	0.071	0.1
	Outfall 002 (BMI-2)	0.0083	0.21	0.143	0.014	1.0	0.45	0.014	0.071	0.2
	Outfall 004 (BMI-4)	0.0084	0.49	0.143	0.014	1.0	0.45	0.032	0.071	0.4
	Downstream (BMI-6)	0.0082	2.50	0.143	0.014	1.0	0.45	0.161	0.071	2.3

Notes:
1) All concentrations in mg/kg, wet weight
2) Fish tissue concentrations represent a mean value for all fish collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in fish represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample

Table 47 (cont'd.). Hazard Quotient Calculations for Smallmouth Bass
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Maximum Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate	AUF	Body Weight (1/2.2 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.076	0.143	0.014	1.0	0.45	0.034	NA	ERR
	Outfall 001 (BMI-1)	3.30	0.150	0.143	0.014	1.0	0.45	0.056	NA	ERR
	Outfall 002 (BMI-2)	1.80	0.100	0.143	0.014	1.0	0.45	0.032	NA	ERR
	Outfall 004 (BMI-4)	2.80	0.094	0.143	0.014	1.0	0.45	0.045	NA	ERR
	Downstream (BMI-6)	0.94	0.100	0.143	0.014	1.0	0.45	0.020	NA	ERR
Cadmium	Reference No. 2	0.11	0.12	0.143	0.014	1.0	0.45	0.009	NA	ERR
	Outfall 001 (BMI-1)	0.18	0.14	0.143	0.014	1.0	0.45	0.012	NA	ERR
	Outfall 002 (BMI-2)	0.17	0.15	0.143	0.014	1.0	0.45	0.012	NA	ERR
	Outfall 004 (BMI-4)	0.12	0.15	0.143	0.014	1.0	0.45	0.011	NA	ERR
	Downstream (BMI-6)	0.16	0.16	0.143	0.014	1.0	0.45	0.013	NA	ERR
Chromium	Reference No. 2	13.00	0.70	0.143	0.014	1.0	0.45	0.127	0.012	10.6
	Outfall 001 (BMI-1)	8.30	0.57	0.143	0.014	1.0	0.45	0.089	0.012	7.4
	Outfall 002 (BMI-2)	7.90	0.73	0.143	0.014	1.0	0.45	0.097	0.012	8.1
	Outfall 004 (BMI-4)	11.50	0.60	0.143	0.014	1.0	0.45	0.111	0.012	9.3
	Downstream (BMI-6)	6.90	0.47	0.143	0.014	1.0	0.45	0.074	0.012	6.1
Copper	Reference No. 2	12.30	0.81	0.143	0.014	1.0	0.45	0.130	NA	ERR
	Outfall 001 (BMI-1)	5.50	4.60	0.143	0.014	1.0	0.45	0.331	NA	ERR
	Outfall 002 (BMI-2)	4.80	1.10	0.143	0.014	1.0	0.45	0.101	NA	ERR
	Outfall 004 (BMI-4)	4.50	1.40	0.143	0.014	1.0	0.45	0.118	NA	ERR
	Downstream (BMI-6)	3.00	1.50	0.143	0.014	1.0	0.45	0.115	NA	ERR
Lead	Reference No. 2	12.30	0.14	0.143	0.014	1.0	0.45	0.086	NA	ERR
	Outfall 001 (BMI-1)	12.00	0.092	0.143	0.014	1.0	0.45	0.082	NA	ERR
	Outfall 002 (BMI-2)	7.30	0.100	0.143	0.014	1.0	0.45	0.052	NA	ERR
	Outfall 004 (BMI-4)	4.50	0.25	0.143	0.014	1.0	0.45	0.044	NA	ERR
	Downstream (BMI-6)	5.30	0.10	0.143	0.014	1.0	0.45	0.040	NA	ERR
Mercury	Reference No. 2	0.49	0.27	0.143	0.014	1.0	0.45	0.020	0.094	0.2
	Outfall 001 (BMI-1)	0.14	0.27	0.143	0.014	1.0	0.45	0.018	0.094	0.2
	Outfall 002 (BMI-2)	0.12	0.26	0.143	0.014	1.0	0.45	0.017	0.094	0.2
	Outfall 004 (BMI-4)	0.032	0.27	0.143	0.014	1.0	0.45	0.018	0.094	0.2
	Downstream (BMI-6)	0.05	0.27	0.143	0.014	1.0	0.45	0.018	0.094	0.2
Nickel	Reference No. 2	8.40	0.39	0.143	0.014	1.0	0.45	0.078	NA	ERR
	Outfall 001 (BMI-1)	4.90	0.46	0.143	0.014	1.0	0.45	0.060	NA	ERR
	Outfall 002 (BMI-2)	4.50	0.51	0.143	0.014	1.0	0.45	0.061	NA	ERR
	Outfall 004 (BMI-4)	4.20	0.47	0.143	0.014	1.0	0.45	0.057	NA	ERR
	Downstream (BMI-6)	3.60	0.52	0.143	0.014	1.0	0.45	0.056	NA	ERR
Zinc	Reference No. 2	44.00	22.00	0.143	0.014	1.0	0.45	1.693	NA	ERR
	Outfall 001 (BMI-1)	33.00	23.00	0.143	0.014	1.0	0.45	1.688	NA	ERR
	Outfall 002 (BMI-2)	30.00	24.00	0.143	0.014	1.0	0.45	1.733	NA	ERR
	Outfall 004 (BMI-4)	29.00	24.00	0.143	0.014	1.0	0.45	1.727	NA	ERR
	Downstream (BMI-6)	25.00	27.00	0.143	0.014	1.0	0.45	1.895	NA	ERR
PCBs (Total)	Reference No. 2	0.0083	0.140	0.143	0.014	1.0	0.45	0.009	0.007	1.3
	Outfall 001 (BMI-1)	0.0082	0.140	0.143	0.014	1.0	0.45	0.009	0.007	1.3
	Outfall 002 (BMI-2)	0.0083	1.00	0.143	0.014	1.0	0.45	0.064	0.007	9.1
	Outfall 004 (BMI-4)	0.0084	1.10	0.143	0.014	1.0	0.45	0.071	0.007	10.0
	Downstream (BMI-6)	0.0082	4.20	0.143	0.014	1.0	0.45	0.270	0.007	38.1

Notes:
1) All concentrations in mg/kg, wet weight
2) Fish tissue concentrations represent a mean value for all fish collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in fish represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample

Table 47 (cont'd.). **Hazard Quotient Calculations for Smallmouth Bass**
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Maximum Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing.	AUF Rate	Body Weight (1/2.2 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.076	0.143	0.014	1.0	0.45	0.034	NA	ERR
	Outfall 001 (BMI-1)	3.30	0.150	0.143	0.014	1.0	0.45	0.056	NA	ERR
	Outfall 002 (BMI-2)	1.80	0.100	0.143	0.014	1.0	0.45	0.032	NA	ERR
	Outfall 004 (BMI-4)	2.80	0.094	0.143	0.014	1.0	0.45	0.045	NA	ERR
	Downstream (BMI-6)	0.94	0.100	0.143	0.014	1.0	0.45	0.020	NA	ERR
Cadmium	Reference No. 2	0.11	0.12	0.143	0.014	1.0	0.45	0.009	NA	ERR
	Outfall 001 (BMI-1)	0.18	0.14	0.143	0.014	1.0	0.45	0.012	NA	ERR
	Outfall 002 (BMI-2)	0.17	0.15	0.143	0.014	1.0	0.45	0.012	NA	ERR
	Outfall 004 (BMI-4)	0.12	0.15	0.143	0.014	1.0	0.45	0.011	NA	ERR
	Downstream (BMI-6)	0.16	0.16	0.143	0.014	1.0	0.45	0.013	NA	ERR
Chromium	Reference No. 2	13.00	0.70	0.143	0.014	1.0	0.45	0.127	0.120	1.1
	Outfall 001 (BMI-1)	8.30	0.57	0.143	0.014	1.0	0.45	0.089	0.120	0.7
	Outfall 002 (BMI-2)	7.90	0.73	0.143	0.014	1.0	0.45	0.097	0.120	0.8
	Outfall 004 (BMI-4)	11.50	0.60	0.143	0.014	1.0	0.45	0.111	0.120	0.9
	Downstream (BMI-6)	6.90	0.47	0.143	0.014	1.0	0.45	0.074	0.120	0.6
Copper	Reference No. 2	12.30	0.81	0.143	0.014	1.0	0.45	0.130	NA	ERR
	Outfall 001 (BMI-1)	5.50	4.60	0.143	0.014	1.0	0.45	0.331	NA	ERR
	Outfall 002 (BMI-2)	4.80	1.10	0.143	0.014	1.0	0.45	0.101	NA	ERR
	Outfall 004 (BMI-4)	4.50	1.40	0.143	0.014	1.0	0.45	0.118	NA	ERR
	Downstream (BMI-6)	3.00	1.50	0.143	0.014	1.0	0.45	0.115	NA	ERR
Lead	Reference No. 2	12.30	0.14	0.143	0.014	1.0	0.45	0.086	NA	ERR
	Outfall 001 (BMI-1)	12.00	0.092	0.143	0.014	1.0	0.45	0.082	NA	ERR
	Outfall 002 (BMI-2)	7.30	0.100	0.143	0.014	1.0	0.45	0.052	NA	ERR
	Outfall 004 (BMI-4)	4.50	0.25	0.143	0.014	1.0	0.45	0.044	NA	ERR
	Downstream (BMI-6)	5.30	0.10	0.143	0.014	1.0	0.45	0.040	NA	ERR
Mercury	Reference No. 2	0.49	0.27	0.143	0.014	1.0	0.45	0.020	0.940	0.0
	Outfall 001 (BMI-1)	0.14	0.27	0.143	0.014	1.0	0.45	0.018	0.940	0.0
	Outfall 002 (BMI-2)	0.12	0.26	0.143	0.014	1.0	0.45	0.017	0.940	0.0
	Outfall 004 (BMI-4)	0.032	0.27	0.143	0.014	1.0	0.45	0.018	0.940	0.0
	Downstream (BMI-6)	0.05	0.27	0.143	0.014	1.0	0.45	0.018	0.940	0.0
Nickel	Reference No. 2	8.40	0.39	0.143	0.014	1.0	0.45	0.078	NA	ERR
	Outfall 001 (BMI-1)	4.90	0.46	0.143	0.014	1.0	0.45	0.060	NA	ERR
	Outfall 002 (BMI-2)	4.50	0.51	0.143	0.014	1.0	0.45	0.061	NA	ERR
	Outfall 004 (BMI-4)	4.20	0.47	0.143	0.014	1.0	0.45	0.057	NA	ERR
	Oownstream (BMI-6)	3.60	0.52	0.143	0.014	1.0	0.45	0.056	NA	ERR
Zinc	Reference No. 2	44.00	22.00	0.143	0.014	1.0	0.45	1.693	NA	ERR
	Outfall 001 (BMI-1)	33.00	23.00	0.143	0.014	1.0	0.45	1.688	NA	ERR
	Outfall 002 (BMI-2)	30.00	24.00	0.143	0.014	1.0	0.45	1.733	NA	ERR
	Outfall 004 (BMI-4)	29.00	24.00	0.143	0.014	1.0	0.45	1.727	NA	ERR
	Downstream (BMI-6)	25.00	27.00	0.143	0.014	1.0	0.45	1.895	NA	ERR
PCBs (Total)	Reference No. 2	0.0083	0.140	0.143	0.014	1.0	0.45	0.009	0.071	0.1
	Outfall 001 (BMI-1)	0.0082	0.140	0.143	0.014	1.0	0.45	0.009	0.071	0.1
	Outfall 002 (BMI-2)	0.0083	1.00	0.143	0.014	1.0	0.45	0.064	0.071	0.9
	Outfall 004 (BMI-4)	0.0084	1.10	0.143	0.014	1.0	0.45	0.071	0.071	1.0
	Downstream (BMI-6)	0.0082	4.20	0.143	0.014	1.0	0.45	0.270	0.071	3.8

Notes:
1) All concentrations in mg/kg, wet weight
2) Fish tissue concentrations represent a mean value for all fish collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in fish represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample

Table 48. Hazard Quotient Calculations for Kingfisher
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Mean Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/0.113 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	[illegible]
Arsenic	Reference No. 2	2.10	0.0011	0.062	0.06	0.0001	0.012	1.0	8.85	0.03	0.33	0.1
	Outfall 01 (BMI-1)	3.30	0.0011	0.086	0.06	0.0001	0.012	1.0	8.85	0.05	0.33	0.1
	Outfall 02 (BMI-2)	1.80	0.0011	0.078	0.06	0.0001	0.012	1.0	8.85	0.04	0.33	0.1
	Outfall 04 (BMI-4)	2.80	0.0011	0.078	0.06	0.0001	0.012	1.0	8.85	0.04	0.33	0.1
	Downstream (BMI-6)	0.94	0.0000	0.070	0.06	0.0001	0.012	1.0	8.85	0.04	0.33	0.1
	Sulfate Basin 5	3.10	0.0011	0.086	0.06	0.0001	0.012	1.0	8.85	0.05	0.33	0.1
Cadmium	Reference No. 2	0.11	0.0015	0.09	0.06	0.0001	0.012	1.0	8.85	0.05	0.33	0.1
	Outfall 01 (BMI-1)	0.18	0.0015	0.12	0.06	0.0001	0.012	1.0	8.85	0.06	0.33	0.2
	Outfall 02 (BMI-2)	0.17	0.0015	0.12	0.06	0.0001	0.012	1.0	8.85	0.06	0.33	0.2
	Outfall 04 (BMI-4)	0.12	0.0015	0.12	0.06	0.0001	0.012	1.0	8.85	0.06	0.33	0.2
	Downstream (BMI-6)	0.16	0.0000	0.12	0.06	0.0001	0.012	1.0	8.85	0.06	0.33	0.2
	Sulfate Basin 5	1.10	0.0015	0.11	0.06	0.0001	0.012	1.0	8.85	0.06	0.33	0.2
Chromium	Reference No. 2	13.00	0.0025	0.39	0.06	0.0001	0.012	1.0	8.85	0.22	27.80	0.0
	Outfall 01 (BMI-1)	8.30	0.0025	0.35	0.06	0.0001	0.012	1.0	8.85	0.19	27.80	0.0
	Outfall 02 (BMI-2)	7.90	0.0025	0.35	0.06	0.0001	0.012	1.0	8.85	0.19	27.80	0.0
	Outfall 04 (BMI-4)	11.50	0.0025	0.36	0.06	0.0001	0.012	1.0	8.85	0.20	27.80	0.0
	Downstream (BMI-6)	6.90	0.0000	0.34	0.06	0.0001	0.012	1.0	8.85	0.19	27.80	0.0
	Sulfate Basin 5	23.00	0.0025	0.48	0.06	0.0001	0.012	1.0	8.85	0.28	27.80	0.0
Copper	Reference No. 2	12.30	0.0025	0.45	0.06	0.0001	0.012	1.0	8.85	0.25	0.235	1.1
	Outfall 01 (BMI-1)	5.50	0.0025	1.10	0.06	0.0001	0.012	1.0	8.85	0.59	0.235	2.5
	Outfall 02 (BMI-2)	4.80	0.0025	0.73	0.06	0.0001	0.012	1.0	8.85	0.39	0.235	1.7
	Outfall 04 (BMI-4)	4.50	0.0025	0.75	0.06	0.0001	0.012	1.0	8.85	0.40	0.235	1.7
	Downstream (BMI-6)	3.00	0.0000	0.81	0.06	0.0001	0.012	1.0	8.85	0.43	0.235	1.8
	Sulfate Basin 5	9.00	0.0025	2.30	0.06	0.0001	0.012	1.0	8.85	1.23	0.235	5.2
Lead	Reference No. 2	12.30	0.0011	0.07	0.06	0.0001	0.012	1.0	8.85	0.05	0.30	0.2
	Outfall 01 (BMI-1)	12.00	0.0011	0.078	0.06	0.0001	0.012	1.0	8.85	0.05	0.30	0.2
	Outfall 02 (BMI-2)	7.30	0.0011	0.078	0.06	0.0001	0.012	1.0	8.85	0.05	0.30	0.2
	Outfall 04 (BMI-4)	4.50	0.0011	0.10	0.06	0.0001	0.012	1.0	8.85	0.06	0.30	0.2
	Downstream (BMI-6)	5.30	0.0000	0.07	0.06	0.0001	0.012	1.0	8.85	0.04	0.30	[illegible]
	Sulfate Basin 5	70.00	0.0022	0.13	0.06	0.0001	0.012	1.0	8.85	0.13	0.30	[illegible]
Mercury	Reference No. 2	0.49	0.0001	0.19	0.06	0.0001	0.012	1.0	8.85	0.10	0.01	10.1
	Outfall 01 (BMI-1)	0.14	0.0001	0.21	0.06	0.0001	0.012	1.0	8.85	0.11	0.01	11.2
	Outfall 02 (BMI-2)	0.12	0.0001	0.22	0.06	0.0001	0.012	1.0	8.85	0.12	0.01	11.7
	Outfall 04 (BMI-4)	0.032	0.0001	0.19	0.06	0.0001	0.012	1.0	8.85	0.10	0.01	10.1
	Downstream (BMI-6)	0.05	0.0000	0.19	0.06	0.0001	0.012	1.0	8.85	0.10	0.01	10.1
	Sulfate Basin 5	0.013	0.0001	0.023	0.06	0.0001	0.012	1.0	8.85	0.01	0.01	1.2
Nickel	Reference No. 2	8.40	0.0050	0.31	0.06	0.0001	0.012	1.0	8.85	0.17	NA	ERR
	Outfall 01 (BMI-1)	4.90	0.0050	0.38	0.06	0.0001	0.012	1.0	8.85	0.21	NA	ERR
	Outfall 02 (BMI-2)	4.50	0.0050	0.38	0.06	0.0001	0.012	1.0	8.85	0.21	NA	ERR
	Outfall 04 (BMI-4)	4.20	0.0050	0.39	0.06	0.0001	0.012	1.0	8.85	0.21	NA	ERR
	Downstream (BMI-6)	3.60	0.0000	0.36	0.06	0.0001	0.012	1.0	8.85	0.19	NA	ERR
	Sulfate Basin 5	4.90	0.0050	0.38	0.06	0.0001	0.012	1.0	8.85	0.21	NA	ERR
Zinc	Reference No. 2	44.00	0.0025	19.00	0.06	0.0001	0.012	1.0	8.85	10.13	13.90	0.7
	Outfall 01 (BMI-1)	33.00	0.0025	19.00	0.06	0.0001	0.012	1.0	8.85	10.12	13.90	0.7
	Outfall 02 (BMI-2)	30.00	0.0025	19.00	0.06	0.0001	0.012	1.0	8.85	10.12	13.90	0.7
	Outfall 04 (BMI-4)	29.00	0.0025	20.00	0.06	0.0001	0.012	1.0	8.85	10.65	13.90	0.8
	Downstream (BMI-6)	25.00	0.0000	21.00	0.06	0.0001	0.012	1.0	8.85	11.17	13.90	0.8
	Sulfate Basin 5	31000.00	0.1200	100.00	0.06	0.0001	0.012	1.0	8.85	80.55	13.90	5.8
PCBs (Total)	Reference No. 2	0.0083	0.00003	0.076	0.06	0.0001	0.012	1.0	8.85	0.04	0.09	0.4
	Outfall 01 (BMI-1)	0.0082	0.00003	0.089	0.06	0.0001	0.012	1.0	8.85	0.05	0.09	0.5
	Outfall 02 (BMI-2)	0.0083	0.00003	0.21	0.06	0.0001	0.012	1.0	8.85	0.11	0.09	1.2
	Outfall 04 (BMI-4)	0.0084	0.00003	0.49	0.06	0.0001	0.012	1.0	8.85	0.26	0.09	2.9
	Downstream (BMI-6)	0.0082	0.00000	2.50	0.06	0.0001	0.012	1.0	8.85	1.33	0.09	14.8
	Sulfate Basin 5	0.0086	0.00003	0.078	0.06	0.0001	0.012	1.0	8.85	0.04	0.09	0.5

Notes
1) All concentrations in mg/kg, wet weight
2) Fish tissue concentrations represent a mean value for all fish collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in fish respresents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) The fish tissue concentrations from the sulfate basin are carp; the concentration from all other locations is based on redbreast sunfish

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Table 48 (cont'd.). Hazard Quotient Calculations for Kingfisher
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Mean Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/0.113 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.0011	0.062	0.06	0.0001	0.012	1.0	8.85	0.03	3.30	0.0
	Outfall 01 (BMI-1)	3.30	0.0011	0.086	0.06	0.0001	0.012	1.0	8.85	0.05	3.30	0.0
	Outfall 02 (BMI-2)	1.80	0.0011	0.078	0.06	0.0001	0.012	1.0	8.85	0.04	3.30	0.0
	Outfall 04 (BMI-4)	2.80	0.0011	0.078	0.06	0.0001	0.012	1.0	8.85	0.04	3.30	0.0
	Downstream (BMI-6)	0.94	0.0000	0.070	0.06	0.0001	0.012	1.0	8.85	0.04	3.30	0.0
	Sulfate Basin 5	3.10	0.0011	0.086	0.06	0.0001	0.012	1.0	8.85	0.05	3.30	0.0
Cadmium	Reference No. 2	0.11	0.0015	0.09	0.06	0.0001	0.012	1.0	8.85	0.05	3.31	0.0
	Outfall 01 (BMI-1)	0.18	0.0015	0.12	0.06	0.0001	0.012	1.0	8.85	0.06	3.31	0.0
	Outfall 02 (BMI-2)	0.17	0.0015	0.12	0.06	0.0001	0.012	1.0	8.85	0.06	3.31	0.0
	Outfall 04 (BMI-4)	0.12	0.0015	0.12	0.06	0.0001	0.012	1.0	8.85	0.06	3.31	0.0
	Downstream (BMI-6)	0.16	0.0000	0.12	0.06	0.0001	0.012	1.0	8.85	0.06	3.31	0.0
	Sulfate Basin 5	1.10	0.0015	0.11	0.06	0.0001	0.012	1.0	8.85	0.06	3.31	0.0
Chromium	Reference No. 2	13.00	0.0025	0.39	0.06	0.0001	0.012	1.0	8.85	0.22	277.80	0.0
	Outfall 01 (BMI-1)	8.30	0.0025	0.35	0.06	0.0001	0.012	1.0	8.85	0.19	277.80	0.0
	Outfall 02 (BMI-2)	7.90	0.0025	0.35	0.06	0.0001	0.012	1.0	8.85	0.19	277.80	0.0
	Outfall 04 (BMI-4)	11.50	0.0025	0.36	0.06	0.0001	0.012	1.0	8.85	0.20	277.80	0.0
	Downstream (BMI-6)	6.90	0.0000	0.34	0.06	0.0001	0.012	1.0	8.85	0.19	277.80	0.0
	Sulfate Basin 5	23.00	0.0025	0.48	0.06	0.0001	0.012	1.0	8.85	0.28	277.80	0.0
Copper	Reference No. 2	12.30	0.0025	0.45	0.06	0.0001	0.012	1.0	8.85	0.25	2.35	0.1
	Outfall 01 (BMI-1)	5.50	0.0025	1.10	0.06	0.0001	0.012	1.0	8.85	0.59	2.35	0.3
	Outfall 02 (BMI-2)	4.80	0.0025	0.73	0.06	0.0001	0.012	1.0	8.85	0.39	2.35	0.2
	Outfall 04 (BMI-4)	4.50	0.0025	0.75	0.06	0.0001	0.012	1.0	8.85	0.40	2.35	0.2
	Downstream (BMI-6)	3.00	0.0000	0.81	0.06	0.0001	0.012	1.0	8.85	0.43	2.35	0.2
	Sulfate Basin 5	9.00	0.0025	2.30	0.06	0.0001	0.012	1.0	8.85	1.23	2.35	0.5
Lead	Reference No. 2	12.30	0.0011	0.07	0.06	0.0001	0.012	1.0	8.85	0.05	3.00	0.0
	Outfall 01 (BMI-1)	12.00	0.0011	0.078	0.06	0.0001	0.012	1.0	8.85	0.05	3.00	0.0
	Outfall 02 (BMI-2)	7.30	0.0011	0.078	0.06	0.0001	0.012	1.0	8.85	0.05	3.00	0.0
	Outfall 04 (BMI-4)	4.50	0.0011	0.10	0.06	0.0001	0.012	1.0	8.85	0.06	3.00	0.0
	Downstream (BMI-6)	5.30	0.0000	0.07	0.06	0.0001	0.012	1.0	8.85	0.04	3.00	0.0
	Sulfate Basin 5	70.00	0.0022	0.13	0.06	0.0001	0.012	1.0	8.85	0.13	3.00	0.0
Mercury	Reference No. 2	0.49	0.0001	0.19	0.06	0.0001	0.012	1.0	8.85	0.10	0.1	1.0
	Outfall 01 (BMI-1)	0.14	0.0001	0.21	0.06	0.0001	0.012	1.0	8.85	0.11	0.1	1.1
	Outfall 02 (BMI-2)	0.12	0.0001	0.22	0.06	0.0001	0.012	1.0	8.85	0.12	0.1	1.2
	Outfall 04 (BMI-4)	0.032	0.0001	0.19	0.06	0.0001	0.012	1.0	8.85	0.10	0.1	1.0
	Downstream (BMI-6)	0.05	0.0000	0.19	0.06	0.0001	0.012	1.0	8.85	0.10	0.1	1.0
	Sulfate Basin 5	0.013	0.0001	0.023	0.06	0.0001	0.012	1.0	8.85	0.01	0.1	0.1
Nickel	Reference No. 2	8.40	0.0050	0.31	0.06	0.0001	0.012	1.0	8.85	0.17	NA	ERR
	Outfall 01 (BMI-1)	4.90	0.0050	0.38	0.06	0.0001	0.012	1.0	8.85	0.21	NA	ERR
	Outfall 02 (BMI-2)	4.50	0.0050	0.38	0.06	0.0001	0.012	1.0	8.85	0.21	NA	ERR
	Outfall 04 (BMI-4)	4.20	0.0050	0.39	0.06	0.0001	0.012	1.0	8.85	0.21	NA	ERR
	Downstream (BMI-6)	3.60	0.0000	0.36	0.06	0.0001	0.012	1.0	8.85	0.19	NA	ERR
	Sulfate Basin 5	4.90	0.0050	0.38	0.06	0.0001	0.012	1.0	8.85	0.21	NA	ERR
Zinc	Reference No. 2	44.00	0.0025	19.00	0.06	0.0001	0.012	1.0	8.85	10.13	139.00	0.1
	Outfall 01 (BMI-1)	33.00	0.0025	19.00	0.06	0.0001	0.012	1.0	8.85	10.12	139.00	0.1
	Outfall 02 (BMI-2)	30.00	0.0025	19.00	0.06	0.0001	0.012	1.0	8.85	10.12	139.00	0.1
	Outfall 04 (BMI-4)	29.00	0.0025	20.00	0.06	0.0001	0.012	1.0	8.85	10.65	139.00	0.1
	Downstream (BMI-6)	25.00	0.0000	21.00	0.06	0.0001	0.012	1.0	8.85	11.17	139.00	0.1
	Sulfate Basin 5	31000.00	0.1200	100.00	0.06	0.0001	0.012	1.0	8.85	80.55	139.00	0.6
PCBs (Total)	Reference No. 2	0.0083	0.00003	0.076	0.06	0.0001	0.012	1.0	8.85	0.04	0.90	0.0
	Outfall 01 (BMI-1)	0.0082	0.00003	0.089	0.06	0.0001	0.012	1.0	8.85	0.05	0.90	0.1
	Outfall 02 (BMI-2)	0.0083	0.00003	0.21	0.06	0.0001	0.012	1.0	8.85	0.11	0.90	0.1
	Outfall 04 (BMI-4)	0.0084	0.00003	0.49	0.06	0.0001	0.012	1.0	8.85	0.26	0.90	0.3
	Downstream (BMI-6)	0.0082	0.00000	2.50	0.06	0.0001	0.012	1.0	8.85	1.33	0.90	1.5
	Sulfate Basin 5	0.0086	0.00003	0.078	0.06	0.0001	0.012	1.0	8.85	0.04	0.90	0.0

Notes:
1) All concentrations in mg/kg, wet weight
2) Fish tissue concentrations represent a mean value for all fish collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in fish respresents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) The fish tissue concentrations from the sulfate basin are carp: the concentration from all other locations is based on redbreast sunfish

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Table 48 (cont'd.). Hazard Quotient Calculations for Kingfisher
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Max. Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/0.113 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	[illegible]
Arsenic	Reference No. 2	2.10	0.0011	0.076	0.06	0.0001	0.012	1.0	8.85	0.04	0.33	0.1
	Outfall 01 (BMI-1)	3.30	0.0011	0.150	0.06	0.0001	0.012	1.0	8.85	0.08	0.33	0.3
	Outfall 02 (BMI-2)	1.80	0.0011	0.100	0.06	0.0001	0.012	1.0	8.85	0.05	0.33	0.2
	Outfall 04 (BMI-4)	2.80	0.0011	0.094	0.06	0.0001	0.012	1.0	8.85	0.05	0.33	0.2
	Downstream (BMI-6)	0.94	0.0000	0.100	0.06	0.0001	0.012	1.0	8.85	0.05	0.33	0.2
	Sulfate Basin 5	3.10	0.0011	0.16	0.06	0.0001	0.012	1.0	8.85	0.09	0.33	0.3
Cadmium	Reference No. 2	0.11	0.0015	0.12	0.06	0.0001	0.012	1.0	8.85	0.06	0.33	0.2
	Outfall 01 (BMI-1)	0.18	0.0015	0.14	0.06	0.0001	0.012	1.0	8.85	0.07	0.33	0.2
	Outfall 02 (BMI-2)	0.17	0.0015	0.15	0.06	0.0001	0.012	1.0	8.85	0.08	0.33	0.2
	Outfall 04 (BMI-4)	0.12	0.0015	0.15	0.06	0.0001	0.012	1.0	8.85	0.08	0.33	0.2
	Downstream (BMI-6)	0.16	0.0000	0.16	0.06	0.0001	0.012	1.0	8.85	0.09	0.33	0.3
	Sulfate Basin 5	1.10	0.0015	0.13	0.06	0.0001	0.012	1.0	8.85	0.07	0.33	0.2
Chromium	Reference No. 2	13.00	0.0025	0.70	0.06	0.0001	0.012	1.0	8.85	0.38	27.80	0.0
	Outfall 01 (BMI-1)	8.30	0.0025	0.57	0.06	0.0001	0.012	1.0	8.85	0.31	27.80	0.0
	Outfall 02 (BMI-2)	7.90	0.0025	0.73	0.06	0.0001	0.012	1.0	8.85	0.39	27.80	0.0
	Outfall 04 (BMI-4)	11.50	0.0025	0.60	0.06	0.0001	0.012	1.0	8.85	0.33	27.80	0.0
	Downstream (BMI-6)	6.90	0.0000	0.47	0.06	0.0001	0.012	1.0	8.85	0.26	27.80	0.0
	Sulfate Basin 5	23.00	0.0025	0.67	0.06	0.0001	0.012	1.0	8.85	0.38	27.80	0.0
Copper	Reference No. 2	12.30	0.0025	0.81	0.06	0.0001	0.012	1.0	8.85	0.44	0.235	1.9
	Outfall 01 (BMI-1)	5.50	0.0025	4.60	0.06	0.0001	0.012	1.0	8.85	2.45	0.235	10.4
	Outfall 02 (BMI-2)	4.80	0.0025	1.10	0.06	0.0001	0.012	1.0	8.85	0.59	0.235	2.5
	Outfall 04 (BMI-4)	4.50	0.0025	1.40	0.06	0.0001	0.012	1.0	8.85	0.75	0.235	3.2
	Downstream (BMI-6)	3.00	0.0000	1.50	0.06	0.0001	0.012	1.0	8.85	0.80	0.235	3.4
	Sulfate Basin 5	9.00	0.0025	11.00	0.06	0.0001	0.012	1.0	8.85	5.85	0.235	24.9
Lead	Reference No. 2	12.30	0.0011	0.14	0.06	0.0001	0.012	1.0	8.85	0.09	0.30	0.3
	Outfall 01 (BMI-1)	12.00	0.0011	0.092	0.06	0.0001	0.012	1.0	8.85	0.06	0.30	0.2
	Outfall 02 (BMI-2)	7.30	0.0011	0.100	0.06	0.0001	0.012	1.0	8.85	0.06	0.30	0.2
	Outfall 04 (BMI-4)	4.50	0.0011	0.25	0.06	0.0001	0.012	1.0	8.85	0.14	0.30	0.5
	Downstream (BMI-6)	5.30	0.0000	0.10	0.06	0.0001	0.012	1.0	8.85	0.06	0.30	[illegible]
	Sulfate Basin 5	70.00	0.0022	0.48	0.06	0.0001	0.012	1.0	8.85	0.32	0.30	[illegible]
Mercury	Reference No. 2	0.49	0.0001	0.27	0.06	0.0001	0.012	1.0	8.85	0.14	0.01	14.4
	Outfall 01 (BMI-1)	0.14	0.0001	0.27	0.06	0.0001	0.012	1.0	8.85	0.14	0.01	14.4
	Outfall 02 (BMI-2)	0.12	0.0001	0.26	0.06	0.0001	0.012	1.0	8.85	0.14	0.01	13.8
	Outfall 04 (BMI-4)	0.032	0.0001	0.27	0.06	0.0001	0.012	1.0	8.85	0.14	0.01	14.3
	Downstream (BMI-6)	0.05	0.0000	0.27	0.06	0.0001	0.012	1.0	8.85	0.14	0.01	14.3
	Sulfate Basin 5	0.013	0.0001	0.04	0.06	0.0001	0.012	1.0	8.85	0.02	0.01	2.1
Nickel	Reference No. 2	8.40	0.0050	0.39	0.06	0.0001	0.012	1.0	8.85	0.22	NA	ERR
	Outfall 01 (BMI-1)	4.90	0.0050	0.46	0.06	0.0001	0.012	1.0	8.85	0.25	NA	ERR
	Outfall 02 (BMI-2)	4.50	0.0050	0.51	0.06	0.0001	0.012	1.0	8.85	0.28	NA	ERR
	Outfall 04 (BMI-4)	4.20	0.0050	0.47	0.06	0.0001	0.012	1.0	8.85	0.25	NA	ERR
	Downstream (BMI-6)	3.60	0.0000	0.52	0.06	0.0001	0.012	1.0	8.85	0.28	NA	ERR
	Sulfate Basin 5	4.90	0.0050	0.43	0.06	0.0001	0.012	1.0	8.85	0.23	NA	ERR
Zinc	Reference No. 2	44.00	0.0025	22.00	0.06	0.0001	0.012	1.0	8.85	11.72	13.90	0.8
	Outfall 01 (BMI-1)	33.00	0.0025	23.00	0.06	0.0001	0.012	1.0	8.85	12.24	13.90	0.9
	Outfall 02 (BMI-2)	30.00	0.0025	24.00	0.06	0.0001	0.012	1.0	8.85	12.77	13.90	0.9
	Outfall 04 (BMI-4)	29.00	0.0025	24.00	0.06	0.0001	0.012	1.0	8.85	12.77	13.90	0.9
	Downstream (BMI-6)	25.00	0.0000	27.00	0.06	0.0001	0.012	1.0	8.85	14.36	13.90	1.0
	Sulfate Basin 5	31000.00	0.1200	270.00	0.06	0.0001	0.012	1.0	8.85	170.82	13.90	12.3
PCBs (Total)	Reference No. 2	0.0083	0.00003	0.140	0.06	0.0001	0.012	1.0	8.85	0.07	0.09	0.8
	Outfall 01 (BMI-1)	0.0082	0.00003	0.140	0.06	0.0001	0.012	1.0	8.85	0.07	0.09	0.8
	Outfall 02 (BMI-2)	0.0083	0.00003	1.00	0.06	0.0001	0.012	1.0	8.85	0.53	0.09	5.9
	Outfall 04 (BMI-4)	0.0084	0.00003	1.10	0.06	0.0001	0.012	1.0	8.85	0.58	0.09	6.5
	Downstream (BMI-6)	0.0082	0.00000	4.20	0.06	0.0001	0.012	1.0	8.85	2.23	0.09	24.8
	Sulfate Basin 5	0.0086	0.00003	0.10	0.06	0.0001	0.012	1.0	8.85	0.05	0.09	0.6

Notes:
1) All concentrations in mg/kg, wet weight
2) Fish tissue concentrations represent a max. value for fish collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in fish respresents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) The fish tissue concentrations from the sulfate basin are carp: the concentration from all other locations is based on redbreast sunfish

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Table 48 (cont'd.). Hazard Quotient Calculations for Kingfisher
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Max. Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/0.113 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.0011	0.076	0.06	0.0001	0.012	1.0	8.85	0.04	3.30	0.0
	Outfall 01 (BMI-1)	3.30	0.0011	0.150	0.06	0.0001	0.012	1.0	8.85	0.08	3.30	0.0
	Outfall 02 (BMI-2)	1.80	0.0011	0.100	0.06	0.0001	0.012	1.0	8.85	0.05	3.30	0.0
	Outfall 04 (BMI-4)	2.80	0.0011	0.094	0.06	0.0001	0.012	1.0	8.85	0.05	3.30	0.0
	Downstream (BMI-6)	0.94	0.0000	0.100	0.06	0.0001	0.012	1.0	8.85	0.05	3.30	0.0
	Sulfate Basin 5	3.10	0.0011	0.16	0.06	0.0001	0.012	1.0	8.85	0.09	3.30	0.0
Cadmium	Reference No. 2	0.11	0.0015	0.12	0.06	0.0001	0.012	1.0	8.85	0.06	3.31	0.0
	Outfall 01 (BMI-1)	0.18	0.0015	0.14	0.06	0.0001	0.012	1.0	8.85	0.07	3.31	0.0
	Outfall 02 (BMI-2)	0.17	0.0015	0.15	0.06	0.0001	0.012	1.0	8.85	0.08	3.31	0.0
	Outfall 04 (BMI-4)	0.12	0.0015	0.15	0.06	0.0001	0.012	1.0	8.85	0.08	3.31	0.0
	Downstream (BMI-6)	0.16	0.0000	0.16	0.06	0.0001	0.012	1.0	8.85	0.09	3.31	0.0
	Sulfate Basin 5	1.10	0.0015	0.13	0.06	0.0001	0.012	1.0	8.85	0.07	3.31	0.0
Chromium	Reference No. 2	13.00	0.0025	0.70	0.06	0.0001	0.012	1.0	8.85	0.38	277.80	0.0
	Outfall 01 (BMI-1)	8.30	0.0025	0.57	0.06	0.0001	0.012	1.0	8.85	0.31	277.80	0.0
	Outfall 02 (BMI-2)	7.90	0.0025	0.73	0.06	0.0001	0.012	1.0	8.85	0.39	277.80	0.0
	Outfall 04 (BMI-4)	11.50	0.0025	0.60	0.06	0.0001	0.012	1.0	8.85	0.33	277.80	0.0
	Downstream (BMI-6)	6.90	0.0000	0.47	0.06	0.0001	0.012	1.0	8.85	0.26	277.80	0.0
	Sulfate Basin 5	23.00	0.0025	0.67	0.06	0.0001	0.012	1.0	8.85	0.38	277.80	0.0
Copper	Reference No. 2	12.30	0.0025	0.81	0.06	0.0001	0.012	1.0	8.85	0.44	2.35	0.2
	Outfall 01 (BMI-1)	5.50	0.0025	4.60	0.06	0.0001	0.012	1.0	8.85	2.45	2.35	1.0
	Outfall 02 (BMI-2)	4.80	0.0025	1.10	0.06	0.0001	0.012	1.0	8.85	0.59	2.35	0.3
	Outfall 04 (BMI-4)	4.50	0.0025	1.40	0.06	0.0001	0.012	1.0	8.85	0.75	2.35	0.3
	Downstream (BMI-6)	3.00	0.0000	1.50	0.06	0.0001	0.012	1.0	8.85	0.80	2.35	0.3
	Sulfate Basin 5	9.00	0.0025	11.00	0.06	0.0001	0.012	1.0	8.85	5.85	2.35	2.5
Lead	Reference No. 2	12.30	0.0011	0.14	0.06	0.0001	0.012	1.0	8.85	0.09	3.00	0.0
	Outfall 01 (BMI-1)	12.00	0.0011	0.092	0.06	0.0001	0.012	1.0	8.85	0.06	3.00	0.0
	Outfall 02 (BMI-2)	7.30	0.0011	0.100	0.06	0.0001	0.012	1.0	8.85	0.06	3.00	0.0
	Outfall 04 (BMI-4)	4.50	0.0011	0.25	0.06	0.0001	0.012	1.0	8.85	0.14	3.00	0.0
	Downstream (BMI-6)	5.30	0.0000	0.10	0.06	0.0001	0.012	1.0	8.85	0.06	3.00	0.0
	Sulfate Basin 5	70.00	0.0022	0.48	0.06	0.0001	0.012	1.0	8.85	0.32	3.00	0.1
Mercury	Reference No. 2	0.49	0.0001	0.27	0.06	0.0001	0.012	1.0	8.85	0.14	0.1	1.4
	Outfall 01 (BMI-1)	0.14	0.0001	0.27	0.06	0.0001	0.012	1.0	8.85	0.14	0.1	1.4
	Outfall 02 (BMI-2)	0.12	0.0001	0.26	0.06	0.0001	0.012	1.0	8.85	0.14	0.1	1.4
	Outfall 04 (BMI-4)	0.032	0.0001	0.27	0.06	0.0001	0.012	1.0	8.85	0.14	0.1	1.4
	Downstream (BMI-6)	0.05	0.0000	0.27	0.06	0.0001	0.012	1.0	8.85	0.14	0.1	1.4
	Sulfate Basin 5	0.013	0.0001	0.04	0.06	0.0001	0.012	1.0	8.85	0.02	0.1	0.2
Nickel	Reference No. 2	8.40	0.0050	0.39	0.06	0.0001	0.012	1.0	8.85	0.22	NA	ERR
	Outfall 01 (BMI-1)	4.90	0.0050	0.46	0.06	0.0001	0.012	1.0	8.85	0.25	NA	ERR
	Outfall 02 (BMI-2)	4.50	0.0050	0.51	0.06	0.0001	0.012	1.0	8.85	0.28	NA	ERR
	Outfall 04 (BMI-4)	4.20	0.0050	0.47	0.06	0.0001	0.012	1.0	8.85	0.25	NA	ERR
	Downstream (BMI-6)	3.60	0.0000	0.52	0.06	0.0001	0.012	1.0	8.85	0.28	NA	ERR
	Sulfate Basin 5	4.90	0.0050	0.43	0.06	0.0001	0.012	1.0	8.85	0.23	NA	ERR
Zinc	Reference No. 2	44.00	0.0025	22.00	0.06	0.0001	0.012	1.0	8.85	11.72	139.00	0.1
	Outfall 01 (BMI-1)	33.00	0.0025	23.00	0.06	0.0001	0.012	1.0	8.85	12.24	139.00	0.1
	Outfall 02 (BMI-2)	30.00	0.0025	24.00	0.06	0.0001	0.012	1.0	8.85	12.77	139.00	0.1
	Outfall 04 (BMI-4)	29.00	0.0025	24.00	0.06	0.0001	0.012	1.0	8.85	12.77	139.00	0.1
	Downstream (BMI-6)	25.00	0.0000	27.00	0.06	0.0001	0.012	1.0	8.85	14.36	139.00	0.1
	Sulfate Basin 5	31000.00	0.1200	270.00	0.06	0.0001	0.012	1.0	8.85	170.82	139.00	1.2
PCBs (Total)	Reference No. 2	0.0083	0.00003	0.140	0.06	0.0001	0.012	1.0	8.85	0.07	0.90	0.1
	Outfall 01 (BMI-1)	0.0082	0.00003	0.140	0.06	0.0001	0.012	1.0	8.85	0.07	0.90	0.1
	Outfall 02 (BMI-2)	0.0083	0.00003	1.00	0.06	0.0001	0.012	1.0	8.85	0.53	0.90	0.6
	Outfall 04 (BMI-4)	0.0084	0.00003	1.10	0.06	0.0001	0.012	1.0	8.85	0.58	0.90	0.6
	Downstream (BMI-6)	0.0082	0.00000	4.20	0.06	0.0001	0.012	1.0	8.85	2.23	0.90	2.5
	Sulfate Basin 5	0.0086	0.00003	0.10	0.06	0.0001	0.012	1.0	8.85	0.05	0.90	0.1

Notes:
1) All concentrations in mg/kg, wet weight
2) Fish tissue concentrations represent a max. value for all fish collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in fish respresents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) The fish tissue concentrations from the sulfate basin are carp: the concentration from all other locations is based on redbreast sunfish

Table 49. Hazard Quotient Calculations for Woodcock
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Mean Conc. in Worms (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate (kg/day)	AUF	Body Weight (1/0.165 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	HQ
Arsenic	Reference	4.50	0.31	0.083	0.0075	1.0	6.06	0.36	0.33	1.1
	Wetland Area	3.80	0.39	0.083	0.0075	1.0	6.06	0.37	0.33	1.1
	WWTP	3.00	0.49	0.083	0.0075	1.0	6.06	0.38	0.33	1.2
	Fly Ash Pile	45.00	2.40	0.083	0.0075	1.0	6.06	3.25	0.33	9.9
	PCB Spill Area	12.00	0.29	0.083	0.0075	1.0	6.06	0.69	0.33	2.1
	Emergency Pond	1.50	0.34	0.083	0.0075	1.0	6.06	0.24	0.33	0.7
Cadmium	Reference	0.14	0.17	0.083	0.0075	1.0	6.06	0.09	0.33	0.3
	Wetland Area	0.20	0.15	0.083	0.0075	1.0	6.06	0.08	0.33	0.3
	WWTP	0.24	0.17	0.083	0.0075	1.0	6.06	0.10	0.33	0.3
	Fly Ash Pile	0.21	0.13	0.083	0.0075	1.0	6.06	0.07	0.33	0.2
	PCB Spill Area	0.75	0.15	0.083	0.0075	1.0	6.06	0.11	0.33	0.3
	Emergency Pond	0.20	0.16	0.083	0.0075	1.0	6.06	0.09	0.33	0.3
Chromium	Reference	13.0	0.28	0.083	0.0075	1.0	6.06	0.73	27.80	0.0
	Wetland Area	13.0	0.25	0.083	0.0075	1.0	6.06	0.72	27.80	0.0
	WWTP	12.0	0.44	0.083	0.0075	1.0	6.06	0.77	27.80	0.0
	Fly Ash Pile	13.0	0.22	0.083	0.0075	1.0	6.06	0.70	27.80	0.0
	PCB Spill Area	12.00	0.26	0.083	0.0075	1.0	6.06	0.68	27.80	0.0
	Emergency Pond	6.60	0.26	0.083	0.0075	1.0	6.06	0.43	27.80	0.0
Copper	Reference	12.0	1.70	0.083	0.0075	1.0	6.06	1.40	0.235	6.0
	Wetland Area	34.0	2.00	0.083	0.0075	1.0	6.06	2.55	0.235	10.9
	WWTP	13.0	3.00	0.083	0.0075	1.0	6.06	2.10	0.235	8.9
	Fly Ash Pile	28.0	1.40	0.083	0.0075	1.0	6.06	1.98	0.235	8.4
	PCB Spill Area	14.00	1.40	0.083	0.0075	1.0	6.06	1.34	0.235	5.7
	Emergency Pond	4.40	1.70	0.083	0.0075	1.0	6.06	1.06	0.235	4.5
Lead	Reference	17.0	0.11	0.083	0.0075	1.0	6.06	0.83	0.30	2.8
	Wetland Area	22.0	0.15	0.083	0.0075	1.0	6.06	1.08	0.30	3.6
	WWTP	20.0	0.11	0.083	0.0075	1.0	6.06	0.96	0.30	3.2
	Fly Ash Pile	9.0	0.13	0.083	0.0075	1.0	6.06	0.47	0.30	1.6
	PCB Spill Area	26.00	0.10	0.083	0.0075	1.0	6.06	1.23	0.30	4.1
	Emergency Pond	6.60	0.10	0.083	0.0075	1.0	6.06	0.35	0.30	1.2
Mercury	Reference	0.017	0.023	0.083	0.0075	1.0	6.06	0.01	0.012	1.0
	Wetland Area	0.057	0.021	0.083	0.0075	1.0	6.06	0.01	0.012	1.1
	WWTP	0.270	0.022	0.083	0.0075	1.0	6.06	0.02	0.012	1.9
	Fly Ash Pile	0.360	0.023	0.083	0.0075	1.0	6.06	0.03	0.012	2.3
	PCB Spill Area	0.008	0.021	0.083	0.0075	1.0	6.06	0.01	0.012	0.9
	Emergency Pond	0.18	0.021	0.083	0.0075	1.0	6.06	0.02	0.012	1.6
Nickel	Reference	10.0	0.56	0.083	0.0075	1.0	6.06	0.74	NA	ERR
	Wetland Area	15.0	0.51	0.083	0.0075	1.0	6.06	0.94	NA	ERR
	WWTP	10.0	0.57	0.083	0.0075	1.0	6.06	0.74	NA	ERR
	Fly Ash Pile	18.0	0.45	0.083	0.0075	1.0	6.06	1.04	NA	ERR
	PCB Spill Area	15.00	0.51	0.083	0.0075	1.0	6.06	0.94	NA	ERR
	Emergency Pond	4.30	0.51	0.083	0.0075	1.0	6.06	0.45	NA	ERR
Zinc	Reference	94.0	14.00	0.083	0.0075	1.0	6.06	11.31	13.90	0.8
	Wetland Area	46.0	11.00	0.083	0.0075	1.0	6.06	7.62	13.90	0.5
	WWTP	568.0	19.00	0.083	0.0075	1.0	6.06	35.37	13.90	2.5
	Fly Ash Pile	22.0	13.00	0.083	0.0075	1.0	6.06	7.54	13.90	0.5
	PCB Spill Area	332.00	14.00	0.083	0.0075	1.0	6.06	22.13	13.90	1.6
	Emergency Pond	38.00	17.00	0.083	0.0075	1.0	6.06	10.28	13.90	0.7
PCBs	Reference	0.008	0.0043	0.083	0.0075	1.0	6.06	0.00	0.09	0.0
	Wetland Area	0.008	0.0037	0.083	0.0075	1.0	6.06	0.00	0.09	0.0
	WWTP	0.008	0.0120	0.083	0.0075	1.0	6.06	0.01	0.09	0.1
	Fly Ash Pile	0.008	0.0031	0.083	0.0075	1.0	6.06	0.00	0.09	0.0
	PCB Spill Area	0.266	0.2500	0.083	0.0075	1.0	6.06	0.14	0.09	1.5
	Emergency Pond	0.008	0.0200	0.083	0.0075	1.0	6.06	0.01	0.09	0.1

Notes.
1) All concentrations in mg/kg, wet weight
2) Worm concentrations represent a mean value for all animals collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in worms represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

\215\del\fr\9902\woodcock.wb2

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Table 49 (cont'd.). Hazard Quotient Calculations for Woodcock
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Mean Conc. in Worms (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate (kg.day)	AUF	Body Weight (1/0.165 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference	4.50	0.31	0.083	0.0075	1.0	6.06	0.36	3.30	0.1
	Wetland Area	3.80	0.39	0.083	0.0075	1.0	6.06	0.37	3.30	0.1
	WWTP	3.00	0.49	0.083	0.0075	1.0	6.06	0.38	3.30	0.1
	Fly Ash Pile	45.00	2.40	0.083	0.0075	1.0	6.06	3.25	3.30	1.0
	PCB Spill Area	12.00	0.29	0.083	0.0075	1.0	6.06	0.69	3.30	0.2
	Emergency Pond	1.50	0.34	0.083	0.0075	1.0	6.06	0.24	3.30	0.1
Cadmium	Reference	0.14	0.17	0.083	0.0075	1.0	6.06	0.09	3.31	0.0
	Wetland Area	0.20	0.15	0.083	0.0075	1.0	6.06	0.08	3.31	0.0
	WWTP	0.24	0.17	0.083	0.0075	1.0	6.06	0.10	3.31	0.0
	Fly Ash Pile	0.21	0.13	0.083	0.0075	1.0	6.06	0.07	3.31	0.0
	PCB Spill Area	0.75	0.15	0.083	0.0075	1.0	6.06	0.11	3.31	0.0
	Emergency Pond	0.20	0.16	0.083	0.0075	1.0	6.06	0.09	3.31	0.0
Chromiun	Reference	13.0	0.28	0.083	0.0075	1.0	6.06	0.73	277.80	0.0
	Wetland Area	13.0	0.25	0.083	0.0075	1.0	6.06	0.72	277.80	0.0
	WWTP	12.0	0.44	0.083	0.0075	1.0	6.06	0.77	277.80	0.0
	Fly Ash Pile	13.0	0.22	0.083	0.0075	1.0	6.06	0.70	277.80	0.0
	PCB Spill Area	12.00	0.26	0.083	0.0075	1.0	6.06	0.68	277.80	0.0
	Emergency Pond	6.60	0.26	0.083	0.0075	1.0	6.06	0.43	277.80	0.0
Copper	Reference	12.0	1.70	0.083	0.0075	1.0	6.06	1.40	2.350	0.6
	Wetland Area	34.0	2.00	0.083	0.0075	1.0	6.06	2.55	2.350	1.1
	WWTP	13.0	3.00	0.083	0.0075	1.0	6.06	2.10	2.350	0.9
	Fly Ash Pile	28.0	1.40	0.083	0.0075	1.0	6.06	1.98	2.350	0.8
	PCB Spill Area	14.00	1.40	0.083	0.0075	1.0	6.06	1.34	2.350	0.6
	Emergency Pond	4.40	1.70	0.083	0.0075	1.0	6.06	1.06	2.350	0.4
Lead	Reference	17.0	0.11	0.083	0.0075	1.0	6.06	0.83	3.00	0.3
	Wetland Area	22.0	0.15	0.083	0.0075	1.0	6.06	1.08	3.00	0.4
	WWTP	20.0	0.11	0.083	0.0075	1.0	6.06	0.96	3.00	0.3
	Fly Ash Pile	9.0	0.13	0.083	0.0075	1.0	6.06	0.47	3.00	0.2
	PCB Spill Area	26.00	0.10	0.083	0.0075	1.0	6.06	1.23	3.00	0.4
	Emergency Pond	6.60	0.10	0.083	0.0075	1.0	6.06	0.35	3.00	0.1
Mercury	Reference	0.017	0.023	0.083	0.0075	1.0	6.06	0.01	0.120	0.1
	Wetland Area	0.057	0.021	0.083	0.0075	1.0	6.06	0.01	0.120	0.1
	WWTP	0.270	0.022	0.083	0.0075	1.0	6.06	0.02	0.120	0.2
	Fly Ash Pile	0.360	0.023	0.083	0.0075	1.0	6.06	0.03	0.120	0.2
	PCB Spill Area	0.008	0.021	0.083	0.0075	1.0	6.06	0.01	0.120	0.1
	Emergency Pond	0.18	0.021	0.083	0.0075	1.0	6.06	0.02	0.120	0.2
Nickel	Reference	10.0	0.56	0.083	0.0075	1.0	6.06	0.74	NA	ERR
	Wetland Area	15.0	0.51	0.083	0.0075	1.0	6.06	0.94	NA	ERR
	WWTP	10.0	0.57	0.083	0.0075	1.0	6.06	0.74	NA	ERR
	Fly Ash Pile	18.0	0.45	0.083	0.0075	1.0	6.06	1.04	NA	ERR
	PCB Spill Area	15.00	0.51	0.083	0.0075	1.0	6.06	0.94	NA	ERR
	Emergency Pond	4.30	0.51	0.083	0.0075	1.0	6.06	0.45	NA	ERR
Zinc	Reference	94.0	14.00	0.083	0.0075	1.0	6.06	11.31	139.00	0.1
	Wetland Area	46.0	11.00	0.083	0.0075	1.0	6.06	7.62	139.00	0.1
	WWTP	568.0	19.00	0.083	0.0075	1.0	6.06	35.37	139.00	0.3
	Fly Ash Pile	22.0	13.00	0.083	0.0075	1.0	6.06	7.54	139.00	0.1
	PCB Spill Area	332.00	14.00	0.083	0.0075	1.0	6.06	22.13	139.00	0.2
	Emergency Pond	38.00	17.00	0.083	0.0075	1.0	6.06	10.28	139.00	0.1
PCBs	Reference	0.008	0.0043	0.083	0.0075	1.0	6.06	0.00	0.90	0.0
	Wetland Area	0.008	0.0037	0.083	0.0075	1.0	6.06	0.00	0.90	0.0
	WWTP	0.008	0.0120	0.083	0.0075	1.0	6.06	0.01	0.90	0.0
	Fly Ash Pile	0.008	0.0031	0.083	0.0075	1.0	6.06	0.00	0.90	0.0
	PCB Spill Area	0.266	0.2500	0.083	0.0075	1.0	6.06	0.14	0.90	0.2
	Emergency Pond	0.008	0.0200	0.083	0.0075	1.0	6.06	0.01	0.90	0.0

Notes:
1) All concentrations in mg/kg, wet weight
2) Worm concentrations represent a mean value for all animals collected from an area.
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in worms represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

\215\del\fr\9902\woodcock.wb2

Table 49 (cont'd.). Hazard Quotient Calculations for Woodcock
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Max. Conc. in Worms (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate (kg/day)	AUF	Body Weight (1/0.165 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	HQ
Arsenic	Reference	4.50	0.32	0.083	0.0075	1.0	6.06	0.37	0.33	1.1
	Wetland Area	3.80	0.53	0.083	0.0075	1.0	6.06	0.44	0.33	1.3
	WWTP	3.00	0.89	0.083	0.0075	1.0	6.06	0.58	0.33	1.8
	Fly Ash Pile	45.00	2.60	0.083	0.0075	1.0	6.06	3.35	0.33	10.2
	PCB Spill Area	12.00	0.30	0.083	0.0075	1.0	6.06	0.70	0.33	2.1
	Emergency Pond	1.50	0.36	0.083	0.0075	1.0	6.06	0.25	0.33	0.8
Cadmium	Reference	0.14	0.18	0.083	0.0075	1.0	6.06	0.10	0.33	0.3
	Wetland Area	0.20	0.17	0.083	0.0075	1.0	6.06	0.09	0.33	0.3
	WWTP	0.24	0.18	0.083	0.0075	1.0	6.06	0.10	0.33	0.3
	Fly Ash Pile	0.21	0.16	0.083	0.0075	1.0	6.06	0.09	0.33	0.3
	PCB Spill Area	0.75	0.17	0.083	0.0075	1.0	6.06	0.12	0.33	0.4
	Emergency Pond	0.20	0.17	0.083	0.0075	1.0	6.06	0.09	0.33	0.3
Chromium	Reference	13.0	0.30	0.083	0.0075	1.0	6.06	0.74	27.80	0.0
	Wetland Area	13.0	0.28	0.083	0.0075	1.0	6.06	0.73	27.80	0.0
	WWTP	12.0	0.78	0.083	0.0075	1.0	6.06	0.94	27.80	0.0
	Fly Ash Pile	13.0	0.27	0.083	0.0075	1.0	6.06	0.73	27.80	0.0
	PCB Spill Area	12.00	0.28	0.083	0.0075	1.0	6.06	0.69	27.80	0.0
	Emergency Pond	6.60	0.27	0.083	0.0075	1.0	6.06	0.44	27.80	0.0
Copper	Reference	12.0	2.00	0.083	0.0075	1.0	6.06	1.55	0.235	6.6
	Wetland Area	34.0	2.30	0.083	0.0075	1.0	6.06	2.70	0.235	11.5
	WWTP	13.0	3.80	0.083	0.0075	1.0	6.06	2.50	0.235	10.6
	Fly Ash Pile	28.0	1.50	0.083	0.0075	1.0	6.06	2.03	0.235	8.6
	PCB Spill Area	14.00	1.50	0.083	0.0075	1.0	6.06	1.39	0.235	5.9
	Emergency Pond	4.40	2.00	0.083	0.0075	1.0	6.06	1.21	0.235	5.1
Lead	Reference	17.0	0.12	0.083	0.0075	1.0	6.06	0.83	0.30	2.8
	Wetland Area	22.0	0.23	0.083	0.0075	1.0	6.06	1.12	0.30	3.7
	WWTP	20.0	0.12	0.083	0.0075	1.0	6.06	0.97	0.30	3.2
	Fly Ash Pile	9.0	0.22	0.083	0.0075	1.0	6.06	0.52	0.30	1.7
	PCB Spill Area	26.00	0.10	0.083	0.0075	1.0	6.06	1.23	0.30	4.1
	Emergency Pond	6.60	0.11	0.083	0.0075	1.0	6.06	0.36	0.30	1.2
Mercury	Reference	0.017	0.025	0.083	0.0075	1.0	6.06	0.01	0.012	1.1
	Wetland Area	0.057	0.023	0.083	0.0075	1.0	6.06	0.01	0.012	1.2
	WWTP	0.270	0.025	0.083	0.0075	1.0	6.06	0.02	0.012	2.1
	Fly Ash Pile	0.360	0.031	0.083	0.0075	1.0	6.06	0.03	0.012	2.7
	PCB Spill Area	0.008	0.024	0.083	0.0075	1.0	6.06	0.01	0.012	1.0
	Emergency Pond	0.18	0.021	0.083	0.0075	1.0	6.06	0.02	0.012	1.6
Nickel	Reference	10.0	0.60	0.083	0.0075	1.0	6.06	0.76	NA	ERR
	Wetland Area	15.0	0.54	0.083	0.0075	1.0	6.06	0.95	NA	ERR
	WWTP	10.0	0.59	0.083	0.0075	1.0	6.06	0.75	NA	ERR
	Fly Ash Pile	18.0	0.55	0.083	0.0075	1.0	6.06	1.09	NA	ERR
	PCB Spill Area	15.00	0.55	0.083	0.0075	1.0	6.06	0.96	NA	ERR
	Emergency Pond	4.30	0.55	0.083	0.0075	1.0	6.06	0.47	NA	ERR
Zinc	Reference	94.0	16.00	0.083	0.0075	1.0	6.06	12.32	13.90	0.9
	Wetland Area	46.0	11.00	0.083	0.0075	1.0	6.06	7.62	13.90	0.5
	WWTP	568.0	20.00	0.083	0.0075	1.0	6.06	35.88	13.90	2.6
	Fly Ash Pile	22.0	14.00	0.083	0.0075	1.0	6.06	8.04	13.90	0.6
	PCB Spill Area	332.00	18.00	0.083	0.0075	1.0	6.06	24.14	13.90	1.7
	Emergency Pond	38.00	21.00	0.083	0.0075	1.0	6.06	12.29	13.90	0.9
PCBs	Reference	0.008	0.0058	0.083	0.0075	1.0	6.06	0.00	0.09	0.0
	Wetland Area	0.008	0.0038	0.083	0.0075	1.0	6.06	0.00	0.09	0.0
	WWTP	0.008	0.0120	0.083	0.0075	1.0	6.06	0.01	0.09	0.1
	Fly Ash Pile	0.008	0.0034	0.083	0.0075	1.0	6.06	0.00	0.09	0.0
	PCB Spill Area	0.266	0.2900	0.083	0.0075	1.0	6.06	0.16	0.09	1.8
	Emergency Pond	0.008	0.0250	0.083	0.0075	1.0	6.06	0.01	0.09	0.1

Notes
1) All concentrations in mg/kg, wet weight
2) Worm concentrations represent a maximum value for all animals collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in worms represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

\215\del\fr\9902\woodcock.wb2

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Table 49 (cont'd.). Hazard Quotient Calculations for Woodcock
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Max. Conc. in Worms (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate (kg/day)	AUF	Body Weight (1/0.165 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference	4.50	0.32	0.083	0.0075	1.0	6.06	0.37	3.30	0.1
	Wetland Area	3.80	0.53	0.083	0.0075	1.0	6.06	0.44	3.30	0.1
	WWTP	3.00	0.89	0.083	0.0075	1.0	6.06	0.58	3.30	0.2
	Fly Ash Pile	45.00	2.60	0.083	0.0075	1.0	6.06	3.35	3.30	1.0
	PCB Spill Area	12.00	0.30	0.083	0.0075	1.0	6.06	0.70	3.30	0.2
	Emergency Pond	1.50	0.36	0.083	0.0075	1.0	6.06	0.25	3.30	0.1
Cadmium	Reference	0.14	0.18	0.083	0.0075	1.0	6.06	0.10	3.31	0.0
	Wetland Area	0.20	0.17	0.083	0.0075	1.0	6.06	0.09	3.31	0.0
	WWTP	0.24	0.18	0.083	0.0075	1.0	6.06	0.10	3.31	0.0
	Fly Ash Pile	0.21	0.16	0.083	0.0075	1.0	6.06	0.09	3.31	0.0
	PCB Spill Area	0.75	0.17	0.083	0.0075	1.0	6.06	0.12	3.31	0.0
	Emergency Pond	0.20	0.17	0.083	0.0075	1.0	6.06	0.09	3.31	0.0
Chromiun	Reference	13.0	0.30	0.083	0.0075	1.0	6.06	0.74	277.80	0.0
	Wetland Area	13.0	0.28	0.083	0.0075	1.0	6.06	0.73	277.80	0.0
	WWTP	12.0	0.78	0.083	0.0075	1.0	6.06	0.94	277.80	0.0
	Fly Ash Pile	13.0	0.27	0.083	0.0075	1.0	6.06	0.73	277.80	0.0
	PCB Spill Area	12.00	0.28	0.083	0.0075	1.0	6.06	0.69	277.80	0.0
	Emergency Pond	6.60	0.27	0.083	0.0075	1.0	6.06	0.44	277.80	0.0
Copper	Reference	12.0	2.00	0.083	0.0075	1.0	6.06	1.55	2.350	0.7
	Wetland Area	34.0	2.30	0.083	0.0075	1.0	6.06	2.70	2.350	1.1
	WWTP	13.0	3.80	0.083	0.0075	1.0	6.06	2.50	2.350	1.1
	Fly Ash Pile	28.0	1.50	0.083	0.0075	1.0	6.06	2.03	2.350	0.9
	PCB Spill Area	14.00	1.50	0.083	0.0075	1.0	6.06	1.39	2.350	0.6
	Emergency Pond	4.40	2.00	0.083	0.0075	1.0	6.06	1.21	2.350	0.5
Lead	Reference	17.0	0.12	0.083	0.0075	1.0	6.06	0.83	3.00	0.3
	Wetland Area	22.0	0.23	0.083	0.0075	1.0	6.06	1.12	3.00	0.4
	WWTP	20.0	0.12	0.083	0.0075	1.0	6.06	0.97	3.00	0.3
	Fly Ash Pile	9.0	0.22	0.083	0.0075	1.0	6.06	0.52	3.00	0.2
	PCB Spill Area	26.00	0.10	0.083	0.0075	1.0	6.06	1.23	3.00	0.4
	Emergency Pond	6.60	0.11	0.083	0.0075	1.0	6.06	0.36	3.00	0.1
Mercury	Reference	0.017	0.025	0.083	0.0075	1.0	6.06	0.01	0.120	0.1
	Wetland Area	0.057	0.023	0.083	0.0075	1.0	6.06	0.01	0.120	0.1
	WWTP	0.270	0.025	0.083	0.0075	1.0	6.06	0.02	0.120	0.2
	Fly Ash Pile	0.360	0.031	0.083	0.0075	1.0	6.06	0.03	0.120	0.3
	PCB Spill Area	0.008	0.024	0.083	0.0075	1.0	6.06	0.01	0.120	0.1
	Emergency Pond	0.18	0.021	0.083	0.0075	1.0	6.06	0.02	0.120	0.2
Nickel	Reference	10.0	0.60	0.083	0.0075	1.0	6.06	0.76	NA	ERR
	Wetland Area	15.0	0.54	0.083	0.0075	1.0	6.06	0.95	NA	ERR
	WWTP	10.0	0.59	0.083	0.0075	1.0	6.06	0.75	NA	ERR
	Fly Ash Pile	18.0	0.55	0.083	0.0075	1.0	6.06	1.09	NA	ERR
	PCB Spill Area	15.00	0.55	0.083	0.0075	1.0	6.06	0.96	NA	ERR
	Emergency Pond	4.30	0.55	0.083	0.0075	1.0	6.06	0.47	NA	ERR
Zinc	Reference	94.0	16.00	0.083	0.0075	1.0	6.06	12.32	139.00	0.1
	Wetland Area	46.0	11.00	0.083	0.0075	1.0	6.06	7.62	139.00	0.1
	WWTP	568.0	20.00	0.083	0.0075	1.0	6.06	35.88	139.00	0.3
	Fly Ash Pile	22.0	14.00	0.083	0.0075	1.0	6.06	8.04	139.00	0.1
	PCB Spill Area	332.00	18.00	0.083	0.0075	1.0	6.06	24.14	139.00	0.2
	Emergency Pond	38.00	21.00	0.083	0.0075	1.0	6.06	12.29	139.00	0.1
PCBs	Reference	0.008	0.0058	0.083	0.0075	1.0	6.06	0.00	0.90	0.0
	Wetland Area	0.008	0.0038	0.083	0.0075	1.0	6.06	0.00	0.90	0.0
	WWTP	0.008	0.0120	0.083	0.0075	1.0	6.06	0.01	0.90	0.0
	Fly Ash Pile	0.008	0.0034	0.083	0.0075	1.0	6.06	0.00	0.90	0.0
	PCB Spill Area	0.266	0.2900	0.083	0.0075	1.0	6.06	0.16	0.90	0.2
	Emergency Pond	0.008	0.0250	0.083	0.0075	1.0	6.06	0.01	0.90	0.0

Notes:
1) All concentrations in mg/kg, wet weight
2) Worm concentrations represent a maximum value for all animals collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in worms represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

Table 50. Hazard Quotient Calculations for Red-tailed Hawk
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Mean Conc. in Mammals (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate	AUF	Body Weight (1/0.96 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	HQ
Arsenic	Reference	4.5	0.10	0.40	0.0028	1.0	1.04	0.05	0.33	0.2
	Wetland Area	3.8	0.11	0.40	0.0028	1.0	1.04	0.06	0.33	0.2
	WWTP	3.0	0.076	0.40	0.0028	1.0	1.04	0.04	0.33	0.1
	Fly Ash Pile	45.0	0.19	0.40	0.0028	1.0	1.04	0.21	0.33	0.6
Cadmium	Reference	0.14	0.18	0.40	0.0028	1.0	1.04	0.08	0.33	0.2
	Wetland Area	0.20	0.17	0.40	0.0028	1.0	1.04	0.07	0.33	0.2
	WWTP	0.24	0.12	0.40	0.0028	1.0	1.04	0.05	0.33	0.2
	Fly Ash Pile	0.21	0.12	0.40	0.0028	1.0	1.04	0.05	0.33	0.2
Chromiun	Reference	13.0	0.62	0.40	0.0028	1.0	1.04	0.30	27.80	0.0
	Wetland Area	13.0	0.50	0.40	0.0028	1.0	1.04	0.25	27.80	0.0
	WWTP	12.0	0.56	0.40	0.0028	1.0	1.04	0.27	27.80	0.0
	Fly Ash Pile	13.0	0.67	0.40	0.0028	1.0	1.04	0.32	27.80	0.0
Copper	Reference	12.0	3.1	0.40	0.0028	1.0	1.04	1.32	0.235	5.6
	Wetland Area	34.0	3.0	0.40	0.0028	1.0	1.04	1.35	0.235	5.7
	WWTP	13.0	2.2	0.40	0.0028	1.0	1.04	0.95	0.235	4.1
	Fly Ash Pile	28.0	2.8	0.40	0.0028	1.0	1.04	1.25	0.235	5.3
Lead	Reference	17.0	0.59	0.40	0.0028	1.0	1.04	0.29	0.30	1.0
	Wetland Area	22.0	1.60	0.40	0.0028	1.0	1.04	0.73	0.30	2.4
	WWTP	20.0	0.18	0.40	0.0028	1.0	1.04	0.13	0.30	0.4
	Fly Ash Pile	9.0	0.078	0.40	0.0028	1.0	1.04	0.06	0.30	0.2
Mercury	Reference	0.017	0.048	0.40	0.0028	1.0	1.04	0.02	0.01	2.0
	Wetland Area	0.057	0.034	0.40	0.0028	1.0	1.04	0.01	0.01	1.4
	WWTP	0.270	0.020	0.40	0.0028	1.0	1.04	0.01	0.01	0.9
	Fly Ash Pile	0.360	0.019	0.40	0.0028	1.0	1.04	0.01	0.01	0.9
Nickel	Reference	10.0	0.39	0.40	0.0028	1.0	1.04	0.19	NA	ERR
	Wetland Area	15.0	0.40	0.40	0.0028	1.0	1.04	0.21	NA	ERR
	WWTP	10.0	0.39	0.40	0.0028	1.0	1.04	0.19	NA	ERR
	Fly Ash Pile	18.0	0.39	0.40	0.0028	1.0	1.04	0.21	NA	ERR
Zinc	Reference	94.0	34.0	0.40	0.0028	1.0	1.04	14.42	13.90	1.0
	Wetland Area	46.0	34.0	0.40	0.0028	1.0	1.04	14.28	13.90	1.0
	WWTP	568.0	28.0	0.40	0.0028	1.0	1.04	13.30	13.90	1.0
	Fly Ash Pile	22.0	27.0	0.40	0.0028	1.0	1.04	11.30	13.90	0.8
PCBs	Reference	0.008	0.02	0.40	0.0028	1.0	1.04	0.01	0.90	0.0
	Wetland Area	0.008	0.56	0.40	0.0028	1.0	1.04	0.23	0.90	0.3
	WWTP	0.008	0.056	0.40	0.0028	1.0	1.04	0.02	0.90	0.0
	Fly Ash Pile	0.008	0.039	0.40	0.0028	1.0	1.04	0.02	0.90	0.0

Notes:
1) All concentrations in mg/kg, wet weight
2) Small mammal concentrations represent a mean value for all animals collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in small mammals represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

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Table 50 (cont'd.). Hazard Quotient Calculations for Red-tailed Hawk
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Mean Conc. in Mammals (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate	AUF	Body Weight (1/0.96 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference	4.5	0.10	0.40	0.0028	1.0	1.04	0.05	3.30	0.0
	Wetland Area	3.8	0.11	0.40	0.0028	1.0	1.04	0.06	3.30	0.0
	WWTP	3.0	0.076	0.40	0.0028	1.0	1.04	0.04	3.30	0.0
	Fly Ash Pile	45.0	0.19	0.40	0.0028	1.0	1.04	0.21	3.30	0.1
Cadmium	Reference	0.14	0.18	0.40	0.0028	1.0	1.04	0.08	3.31	0.0
	Wetland Area	0.20	0.17	0.40	0.0028	1.0	1.04	0.07	3.31	0.0
	WWTP	0.24	0.12	0.40	0.0028	1.0	1.04	0.05	3.31	0.0
	Fly Ash Pile	0.21	0.12	0.40	0.0028	1.0	1.04	0.05	3.31	0.0
Chromiun	Reference	13.0	0.62	0.40	0.0028	1.0	1.04	0.30	277.80	0.0
	Wetland Area	13.0	0.50	0.40	0.0028	1.0	1.04	0.25	277.80	0.0
	WWTP	12.0	0.56	0.40	0.0028	1.0	1.04	0.27	277.80	0.0
	Fly Ash Pile	13.0	0.67	0.40	0.0028	1.0	1.04	0.32	277.80	0.0
Copper	Reference	12.0	3.1	0.40	0.0028	1.0	1.04	1.32	2.350	0.6
	Wetland Area	34.0	3.0	0.40	0.0028	1.0	1.04	1.35	2.350	0.6
	WWTP	13.0	2.2	0.40	0.0028	1.0	1.04	0.95	2.350	0.4
	Fly Ash Pile	28.0	2.8	0.40	0.0028	1.0	1.04	1.25	2.350	0.5
Lead	Reference	17.0	0.59	0.40	0.0028	1.0	1.04	0.29	3.00	0.1
	Wetland Area	22.0	1.60	0.40	0.0028	1.0	1.04	0.73	3.00	0.2
	WWTP	20.0	0.18	0.40	0.0028	1.0	1.04	0.13	3.00	0.0
	Fly Ash Pile	9.0	0.078	0.40	0.0028	1.0	1.04	0.06	3.00	0.0
Mercury	Reference	0.017	0.048	0.40	0.0028	1.0	1.04	0.02	0.10	0.2
	Wetland Area	0.057	0.034	0.40	0.0028	1.0	1.04	0.01	0.10	0.1
	WWTP	0.270	0.020	0.40	0.0028	1.0	1.04	0.01	0.10	0.1
	Fly Ash Pile	0.360	0.019	0.40	0.0028	1.0	1.04	0.01	0.10	0.1
Nickel	Reference	10.0	0.39	0.40	0.0028	1.0	1.04	0.19	NA	ERR
	Wetland Area	15.0	0.40	0.40	0.0028	1.0	1.04	0.21	NA	ERR
	WWTP	10.0	0.39	0.40	0.0028	1.0	1.04	0.19	NA	ERR
	Fly Ash Pile	18.0	0.39	0.40	0.0028	1.0	1.04	0.21	NA	ERR
Zinc	Reference	94.0	34.0	0.40	0.0028	1.0	1.04	14.42	139.00	0.1
	Wetland Area	46.0	34.0	0.40	0.0028	1.0	1.04	14.28	139.00	0.1
	WWTP	568.0	28.0	0.40	0.0028	1.0	1.04	13.30	139.00	0.1
	Fly Ash Pile	22.0	27.0	0.40	0.0028	1.0	1.04	11.30	139.00	0.1
PCBs	Reference	0.008	0.02	0.40	0.0028	1.0	1.04	0.01	9.00	0.0
	Wetland Area	0.008	0.56	0.40	0.0028	1.0	1.04	0.23	9.00	0.0
	WWTP	0.008	0.056	0.40	0.0028	1.0	1.04	0.02	9.00	0.0
	Fly Ash Pile	0.008	0.039	0.40	0.0028	1.0	1.04	0.02	9.00	0.0

Notes:
1) All concentrations in mg/kg, wet weight
2) Small mammal concentrations represent a mean value for all animals collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in small mammals represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

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Table 50 (cont'd.). Hazard Quotient Calculations for Red-tailed Hawk
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Max. Conc. in Mammals (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate	AUF	Body Weight (1/0.96 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/da	HQ
Arsenic	Reference	4.5	0.15	0.40	0.0028	1.0	1.04	0.08	0.33	0.2
	Wetland Area	3.8	0.18	0.40	0.0028	1.0	1.04	0.09	0.33	0.3
	WWTP	3.0	0.092	0.40	0.0028	1.0	1.04	0.05	0.33	0.1
	Fly Ash Pile	45.0	0.31	0.40	0.0028	1.0	1.04	0.26	0.33	0.8
Cadmium	Reference	0.14	0.45	0.40	0.0028	1.0	1.04	0.19	0.33	0.6
	Wetland Area	0.20	0.30	0.40	0.0028	1.0	1.04	0.13	0.33	0.4
	WWTP	0.24	0.14	0.40	0.0028	1.0	1.04	0.06	0.33	0.2
	Fly Ash Pile	0.21	0.14	0.40	0.0028	1.0	1.04	0.06	0.33	0.2
Chromiun	Reference	13.0	1.10	0.40	0.0028	1.0	1.04	0.50	27.80	0.0
	Wetland Area	13.0	0.78	0.40	0.0028	1.0	1.04	0.36	27.80	0.0
	WWTP	12.0	0.78	0.40	0.0028	1.0	1.04	0.36	27.80	0.0
	Fly Ash Pile	13.0	0.95	0.40	0.0028	1.0	1.04	0.43	27.80	0.0
Copper	Reference	12.0	5.60	0.40	0.0028	1.0	1.04	2.36	0.235	10.1
	Wetland Area	34.0	4.00	0.40	0.0028	1.0	1.04	1.76	0.235	7.5
	WWTP	13.0	3.10	0.40	0.0028	1.0	1.04	1.33	0.235	5.6
	Fly Ash Pile	28.0	6.20	0.40	0.0028	1.0	1.04	2.66	0.235	11.3
Lead	Reference	17.0	2.80	0.40	0.0028	1.0	1.04	1.21	0.30	4.0
	Wetland Area	22.0	4.00	0.40	0.0028	1.0	1.04	1.73	0.30	5.8
	WWTP	20.0	0.81	0.40	0.0028	1.0	1.04	0.40	0.30	1.3
	Fly Ash Pile	9.0	0.092	0.40	0.0028	1.0	1.04	0.06	0.30	0.2
Mercury	Reference	0.017	0.076	0.40	0.0028	1.0	1.04	0.03	0.01	3.2
	Wetland Area	0.057	0.074	0.40	0.0028	1.0	1.04	0.03	0.01	3.1
	WWTP	0.270	0.024	0.40	0.0028	1.0	1.04	0.01	0.01	1.1
	Fly Ash Pile	0.360	0.025	0.40	0.0028	1.0	1.04	0.01	0.01	1.1
Nickel	Reference	10.0	0.76	0.40	0.0028	1.0	1.04	0.35	NA	ERR
	Wetland Area	15.0	0.47	0.40	0.0028	1.0	1.04	0.24	NA	ERR
	WWTP	10.0	0.48	0.40	0.0028	1.0	1.04	0.23	NA	ERR
	Fly Ash Pile	18.0	0.47	0.40	0.0028	1.0	1.04	0.25	NA	ERR
Zinc	Reference	94.0	67.0	0.40	0.0028	1.0	1.04	28.15	13.90	2.0
	Wetland Area	46.0	40.0	0.40	0.0028	1.0	1.04	16.77	13.90	1.2
	WWTP	568.0	31.0	0.40	0.0028	1.0	1.04	14.55	13.90	1.0
	Fly Ash Pile	22.0	34.0	0.40	0.0028	1.0	1.04	14.21	13.90	1.0
PCBs	Reference	0.008	0.064	0.40	0.0028	1.0	1.04	0.03	0.90	0.0
	Wetland Area	0.008	2.000	0.40	0.0028	1.0	1.04	0.83	0.90	0.9
	WWTP	0.008	0.210	0.40	0.0028	1.0	1.04	0.09	0.90	0.1
	Fly Ash Pile	0.008	0.260	0.40	0.0028	1.0	1.04	0.11	0.90	0.1

Notes:
1) All concentrations in mg/kg, wet weight
2) Small mammal concentrations represent a maximum value for all animals collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in small mammals represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

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Table 50 (cont'd.). Hazard Quotient Calculations for Red-tailed Hawk
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Max. Conc. in Mammals (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate	AUF	Body Weight (1/0.96 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/da	HQ
Arsenic	Reference	4.5	0.15	0.40	0.0028	1.0	1.04	0.08	3.30	0.0
	Wetland Area	3.8	0.18	0.40	0.0028	1.0	1.04	0.09	3.30	0.0
	WWTP	3.0	0.092	0.40	0.0028	1.0	1.04	0.05	3.30	0.0
	Fly Ash Pile	45.0	0.31	0.40	0.0028	1.0	1.04	0.26	3.30	0.1
Cadmium	Reference	0.14	0.45	0.40	0.0028	1.0	1.04	0.19	3.31	0.1
	Wetland Area	0.20	0.30	0.40	0.0028	1.0	1.04	0.13	3.31	0.0
	WWTP	0.24	0.14	0.40	0.0028	1.0	1.04	0.06	3.31	0.0
	Fly Ash Pile	0.21	0.14	0.40	0.0028	1.0	1.04	0.06	3.31	0.0
Chromiun	Reference	13.0	1.10	0.40	0.0028	1.0	1.04	0.50	277.80	0.0
	Wetland Area	13.0	0.78	0.40	0.0028	1.0	1.04	0.36	277.80	0.0
	WWTP	12.0	0.78	0.40	0.0028	1.0	1.04	0.36	277.80	0.0
	Fly Ash Pile	13.0	0.95	0.40	0.0028	1.0	1.04	0.43	277.80	0.0
Copper	Reference	12.0	5.60	0.40	0.0028	1.0	1.04	2.36	2.350	1.0
	Wetland Area	34.0	4.00	0.40	0.0028	1.0	1.04	1.76	2.350	0.8
	WWTP	13.0	3.10	0.40	0.0028	1.0	1.04	1.33	2.350	0.6
	Fly Ash Pile	28.0	6.20	0.40	0.0028	1.0	1.04	2.66	2.350	1.1
Lead	Reference	17.0	2.80	0.40	0.0028	1.0	1.04	1.21	3.00	0.4
	Wetland Area	22.0	4.00	0.40	0.0028	1.0	1.04	1.73	3.00	0.6
	WWTP	20.0	0.81	0.40	0.0028	1.0	1.04	0.40	3.00	0.1
	Fly Ash Pile	9.0	0.092	0.40	0.0028	1.0	1.04	0.06	3.00	0.0
Mercury	Reference	0.017	0.076	0.40	0.0028	1.0	1.04	0.03	0.10	0.3
	Wetland Area	0.057	0.074	0.40	0.0028	1.0	1.04	0.03	0.10	0.3
	WWTP	0.270	0.024	0.40	0.0028	1.0	1.04	0.01	0.10	0.1
	Fly Ash Pile	0.360	0.025	0.40	0.0028	1.0	1.04	0.01	0.10	0.1
Nickel	Reference	10.0	0.76	0.40	0.0028	1.0	1.04	0.35	NA	ERR
	Wetland Area	15.0	0.47	0.40	0.0028	1.0	1.04	0.24	NA	ERR
	WWTP	10.0	0.48	0.40	0.0028	1.0	1.04	0.23	NA	ERR
	Fly Ash Pile	18.0	0.47	0.40	0.0028	1.0	1.04	0.25	NA	ERR
Zinc	Reference	94.0	67.0	0.40	0.0028	1.0	1.04	28.15	139.00	0.2
	Wetland Area	46.0	40.0	0.40	0.0028	1.0	1.04	16.77	139.00	0.1
	WWTP	568.0	31.0	0.40	0.0028	1.0	1.04	14.55	139.00	0.1
	Fly Ash Pile	22.0	34.0	0.40	0.0028	1.0	1.04	14.21	139.00	0.1
PCBs	Reference	0.008	0.064	0.40	0.0028	1.0	1.04	0.03	9.00	0.0
	Wetland Area	0.008	2.000	0.40	0.0028	1.0	1.04	0.83	9.00	0.1
	WWTP	0.008	0.210	0.40	0.0028	1.0	1.04	0.09	9.00	0.0
	Fly Ash Pile	0.008	0.260	0.40	0.0028	1.0	1.04	0.11	9.00	0.0

Notes:
1) All concentrations in mg/kg. wet weight
2) Small mammal concentrations represent a maximum value for all animals collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in small mammals represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

Table 51. Hazard Quotient Calculations for Red Fox
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Mean Conc. in Mammals (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate	AUF	Body Weight (1/2.7 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	HQ
Arsenic	Reference	4.5	0.10	0.432	0.012	1.0	0.37	0.04	0.15	0.2
	Wetland Area	3.8	0.11	0.432	0.012	1.0	0.37	0.03	0.15	0.2
	WWTP	3.0	0.076	0.432	0.012	1.0	0.37	0.03	0.15	0.2
	Fly Ash Pile	45.0	0.19	0.432	0.012	1.0	0.37	0.23	0.15	1.5
Cadmium	Reference	0.14	0.18	0.432	0.012	1.0	0.37	0.03	0.75	0.0
	Wetland Area	0.20	0.17	0.432	0.012	1.0	0.37	0.03	0.75	0.0
	WWTP	0.24	0.12	0.432	0.012	1.0	0.37	0.02	0.75	0.0
	Fly Ash Pile	0.21	0.12	0.432	0.012	1.0	0.37	0.02	0.75	0.0
Chromiun	Reference	13.0	0.62	0.432	0.012	1.0	0.37	0.16	0.17	0.9
	Wetland Area	13.0	0.50	0.432	0.012	1.0	0.37	0.14	0.17	0.8
	WWTP	12.0	0.56	0.432	0.012	1.0	0.37	0.14	0.17	0.8
	Fly Ash Pile	13.0	0.67	0.432	0.012	1.0	0.37	0.16	0.17	1.0
Copper	Reference	12.0	3.1	0.432	0.012	1.0	0.37	0.55	1.00	0.5
	Wetland Area	34.0	3.0	0.432	0.012	1.0	0.37	0.63	1.00	0.6
	WWTP	13.0	2.2	0.432	0.012	1.0	0.37	0.41	1.00	0.4
	Fly Ash Pile	28.0	2.8	0.432	0.012	1.0	0.37	0.57	1.00	0.6
Lead	Reference	17.0	0.59	0.432	0.012	1.0	0.37	0.17	0.15	1.1
	Wetland Area	22.0	1.60	0.432	0.012	1.0	0.37	0.35	0.15	2.4
	WWTP	20.0	0.18	0.432	0.012	1.0	0.37	0.12	0.15	0.8
	Fly Ash Pile	9.0	0.078	0.432	0.012	1.0	0.37	0.05	0.15	0.3
Mercury	Reference	0.017	0.048	0.432	0.012	1.0	0.37	0.01	0.01	[illegible]
	Wetland Area	0.057	0.034	0.432	0.012	1.0	0.37	0.01	0.01	0.6
	WWTP	0.270	0.020	0.432	0.012	1.0	0.37	0.00	0.01	0.4
	Fly Ash Pile	0.360	0.019	0.432	0.012	1.0	0.37	0.00	0.01	0.5
Nickel	Reference	10.0	0.39	0.432	0.012	1.0	0.37	0.11	62.50	0.0
	Wetland Area	15.0	0.40	0.432	0.012	1.0	0.37	0.13	62.50	0.0
	WWTP	10.0	0.39	0.432	0.012	1.0	0.37	0.11	62.50	0.0
	Fly Ash Pile	18.0	0.39	0.432	0.012	1.0	0.37	0.14	62.50	0.0
Zinc	Reference	94.0	34.0	0.432	0.012	1.0	0.37	5.85	25.00	0.2
	Wetland Area	46.0	34.0	0.432	0.012	1.0	0.37	5.64	25.00	0.2
	WWTP	568.0	28.0	0.432	0.012	1.0	0.37	7.00	25.00	0.3
	Fly Ash Pile	22.0	27.0	0.432	0.012	1.0	0.37	4.41	25.00	0.2
PCBs	Reference	0.008	0.02	0.432	0.012	1.0	0.37	0.00	0.10	0.0
	Wetland Area	0.008	0.56	0.432	0.012	1.0	0.37	0.09	0.10	0.9
	WWTP	0.008	0.056	0.432	0.012	1.0	0.37	0.01	0.10	0.1
	Fly Ash Pile	0.008	0.039	0.432	0.012	1.0	0.37	0.01	0.10	0.1

Notes:
1) All concentrations in mg/kg, wet weight
2) Small mammal concentrations represent a mean value for all animals collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in small mammals represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

Table 51 (cont'd.). Hazard Quotient Calculations for Red Fox
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Mean Conc. in Mammals (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate	AUF	Body Weight (1/2.7 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference	4.5	0.10	0.432	0.012	1.0	0.37	0.04	1.50	0.0
	Wetland Area	3.8	0.11	0.432	0.012	1.0	0.37	0.03	1.50	0.0
	WWTP	3.0	0.076	0.432	0.012	1.0	0.37	0.03	1.50	0.0
	Fly Ash Pile	45.0	0.19	0.432	0.012	1.0	0.37	0.23	1.50	0.2
Cadmium	Reference	0.14	0.18	0.432	0.012	1.0	0.37	0.03	7.50	0.0
	Wetland Area	0.20	0.17	0.432	0.012	1.0	0.37	0.03	7.50	0.0
	WWTP	0.24	0.12	0.432	0.012	1.0	0.37	0.02	7.50	0.0
	Fly Ash Pile	0.21	0.12	0.432	0.012	1.0	0.37	0.02	7.50	0.0
Chromiun	Reference	13.0	0.62	0.432	0.012	1.0	0.37	0.16	1.70	0.1
	Wetland Area	13.0	0.50	0.432	0.012	1.0	0.37	0.14	1.70	0.1
	WWTP	12.0	0.56	0.432	0.012	1.0	0.37	0.14	1.70	0.1
	Fly Ash Pile	13.0	0.67	0.432	0.012	1.0	0.37	0.16	1.70	0.1
Copper	Reference	12.0	3.1	0.432	0.012	1.0	0.37	0.55	10.00	0.1
	Wetland Area	34.0	3.0	0.432	0.012	1.0	0.37	0.63	10.00	0.1
	WWTP	13.0	2.2	0.432	0.012	1.0	0.37	0.41	10.00	0.0
	Fly Ash Pile	28.0	2.8	0.432	0.012	1.0	0.37	0.57	10.00	0.1
Lead	Reference	17.0	0.59	0.432	0.012	1.0	0.37	0.17	1.50	0.1
	Wetland Area	22.0	1.60	0.432	0.012	1.0	0.37	0.35	1.50	0.2
	WWTP	20.0	0.18	0.432	0.012	1.0	0.37	0.12	1.50	0.1
	Fly Ash Pile	9.0	0.078	0.432	0.012	1.0	0.37	0.05	1.50	0.0
Mercury	Reference	0.017	0.048	0.432	0.012	1.0	0.37	0.01	0.10	0.1
	Wetland Area	0.057	0.034	0.432	0.012	1.0	0.37	0.01	0.10	0.1
	WWTP	0.270	0.020	0.432	0.012	1.0	0.37	0.00	0.10	0.0
	Fly Ash Pile	0.360	0.019	0.432	0.012	1.0	0.37	0.00	0.10	0.0
Nickel	Reference	10.0	0.39	0.432	0.012	1.0	0.37	0.11	625.00	0.0
	Wetland Area	15.0	0.40	0.432	0.012	1.0	0.37	0.13	625.00	0.0
	WWTP	10.0	0.39	0.432	0.012	1.0	0.37	0.11	625.00	0.0
	Fly Ash Pile	18.0	0.39	0.432	0.012	1.0	0.37	0.14	625.00	0.0
Zinc	Reference	94.0	34.0	0.432	0.012	1.0	0.37	5.85	250.00	0.0
	Wetland Area	46.0	34.0	0.432	0.012	1.0	0.37	5.64	250.00	0.0
	WWTP	568.0	28.0	0.432	0.012	1.0	0.37	7.00	250.00	0.0
	Fly Ash Pile	22.0	27.0	0.432	0.012	1.0	0.37	4.41	250.00	0.0
PCBs	Reference	0.008	0.02	0.432	0.012	1.0	0.37	0.00	0.13	0.0
	Wetland Area	0.008	0.56	0.432	0.012	1.0	0.37	0.09	0.13	0.7
	WWTP	0.008	0.056	0.432	0.012	1.0	0.37	0.01	0.13	0.1
	Fly Ash Pile	0.008	0.039	0.432	0.012	1.0	0.37	0.01	0.13	0.0

Notes:
1) All concentrations in mg/kg, wet weight
2) Small mammal concentrations represent a mean value for all animals collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in small mammals represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

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Table 51 (cont'd.). Hazard Quotient Calculations for Red Fox
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Max. Conc. in Mammals (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate	AUF	Body Weight (1/2.7 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	HQ
Arsenic	Reference	4.5	0.15	0.432	0.012	1.0	0.37	0.04	0.15	0.3
	Wetland Area	3.8	0.18	0.432	0.012	1.0	0.37	0.05	0.15	0.3
	WWTP	3.0	0.092	0.432	0.012	1.0	0.37	0.03	0.15	0.2
	Fly Ash Pile	45.0	0.31	0.432	0.012	1.0	0.37	0.25	0.15	1.7
Cadmium	Reference	0.14	0.45	0.432	0.012	1.0	0.37	0.07	0.75	0.1
	Wetland Area	0.20	0.30	0.432	0.012	1.0	0.37	0.05	0.75	0.1
	WWTP	0.24	0.14	0.432	0.012	1.0	0.37	0.02	0.75	0.0
	Fly Ash Pile	0.21	0.14	0.432	0.012	1.0	0.37	0.02	0.75	0.0
Chromiun	Reference	13.0	1.10	0.432	0.012	1.0	0.37	0.23	0.17	1.4
	Wetland Area	13.0	0.78	0.432	0.012	1.0	0.37	0.18	0.17	1.1
	WWTP	12.0	0.78	0.432	0.012	1.0	0.37	0.18	0.17	1.0
	Fly Ash Pile	13.0	0.95	0.432	0.012	1.0	0.37	0.21	0.17	1.2
Copper	Reference	12.0	5.60	0.432	0.012	1.0	0.37	0.95	1.00	0.9
	Wetland Area	34.0	4.00	0.432	0.012	1.0	0.37	0.79	1.00	0.8
	WWTP	13.0	3.10	0.432	0.012	1.0	0.37	0.55	1.00	0.6
	Fly Ash Pile	28.0	6.20	0.432	0.012	1.0	0.37	1.12	1.00	1.1
Lead	Reference	17.0	2.80	0.432	0.012	1.0	0.37	0.52	0.15	3.5
	Wetland Area	22.0	4.00	0.432	0.012	1.0	0.37	0.74	0.15	4.9
	WWTP	20.0	0.81	0.432	0.012	1.0	0.37	0.22	0.15	1.5
	Fly Ash Pile	9.0	0.092	0.432	0.012	1.0	0.37	0.05	0.15	0.4
Mercury	Reference	0.017	0.076	0.432	0.012	1.0	0.37	0.01	0.01	1.2
	Wetland Area	0.057	0.074	0.432	0.012	1.0	0.37	0.01	0.01	1.2
	WWTP	0.270	0.024	0.432	0.012	1.0	0.37	0.01	0.01	0.5
	Fly Ash Pile	0.360	0.025	0.432	0.012	1.0	0.37	0.01	0.01	0.6
Nickel	Reference	10.0	0.76	0.432	0.012	1.0	0.37	0.17	62.50	0.0
	Wetland Area	15.0	0.47	0.432	0.012	1.0	0.37	0.14	62.50	0.0
	WWTP	10.0	0.48	0.432	0.012	1.0	0.37	0.12	62.50	0.0
	Fly Ash Pile	18.0	0.47	0.432	0.012	1.0	0.37	0.16	62.50	0.0
Zinc	Reference	94.0	67.0	0.432	0.012	1.0	0.37	11.13	25.00	0.4
	Wetland Area	46.0	40.0	0.432	0.012	1.0	0.37	6.60	25.00	0.3
	WWTP	568.0	31.0	0.432	0.012	1.0	0.37	7.48	25.00	0.3
	Fly Ash Pile	22.0	34.0	0.432	0.012	1.0	0.37	5.53	25.00	0.2
PCBs	Reference	0.008	0.064	0.432	0.012	1.0	0.37	0.01	0.10	0.1
	Wetland Area	0.008	2.000	0.432	0.012	1.0	0.37	0.32	0.10	3.2
	WWTP	0.008	0.210	0.432	0.012	1.0	0.37	0.03	0.10	0.3
	Fly Ash Pile	0.008	0.260	0.432	0.012	1.0	0.37	0.04	0.10	0.4

Notes:
1) All concentrations in mg/kg, wet weight
2) Small mammal concentrations represent a max. value based on all animals collected from an area.
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in small mammals represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

Table 51 (cont'd.). Hazard Quotient Calculations for Red Fox
Aytex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Soil Conc. (mg/kg)	Max. Conc. in Mammals (mg/kg)	Ingestion Rate (kg/day)	Soil Ing. Rate	AUF	Body Weight (1/2.7 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference	4.5	0.15	0.432	0.012	1.0	0.37	0.04	1.50	0.0
	Wetland Area	3.8	0.18	0.432	0.012	1.0	0.37	0.05	1.50	0.0
	WWTP	3.0	0.092	0.432	0.012	1.0	0.37	0.03	1.50	0.0
	Fly Ash Pile	45.0	0.31	0.432	0.012	1.0	0.37	0.25	1.50	0.2
Cadmium	Reference	0.14	0.45	0.432	0.012	1.0	0.37	0.07	7.50	0.0
	Wetland Area	0.20	0.30	0.432	0.012	1.0	0.37	0.05	7.50	0.0
	WWTP	0.24	0.14	0.432	0.012	1.0	0.37	0.02	7.50	0.0
	Fly Ash Pile	0.21	0.14	0.432	0.012	1.0	0.37	0.02	7.50	0.0
Chromiun	Reference	13.0	1.10	0.432	0.012	1.0	0.37	0.23	1.70	0.1
	Wetland Area	13.0	0.78	0.432	0.012	1.0	0.37	0.18	1.70	0.1
	WWTP	12.0	0.78	0.432	0.012	1.0	0.37	0.18	1.70	0.1
	Fly Ash Pile	13.0	0.95	0.432	0.012	1.0	0.37	0.21	1.70	0.1
Copper	Reference	12.0	5.60	0.432	0.012	1.0	0.37	0.95	10.00	0.1
	Wetland Area	34.0	4.00	0.432	0.012	1.0	0.37	0.79	10.00	0.1
	WWTP	13.0	3.10	0.432	0.012	1.0	0.37	0.55	10.00	0.1
	Fly Ash Pile	28.0	6.20	0.432	0.012	1.0	0.37	1.12	10.00	0.1
Lead	Reference	17.0	2.80	0.432	0.012	1.0	0.37	0.52	1.50	0.3
	Wetland Area	22.0	4.00	0.432	0.012	1.0	0.37	0.74	1.50	0.5
	WWTP	20.0	0.81	0.432	0.012	1.0	0.37	0.22	1.50	0.1
	Fly Ash Pile	9.0	0.092	0.432	0.012	1.0	0.37	0.05	1.50	0.0
Mercury	Reference	0.017	0.076	0.432	0.012	1.0	0.37	0.01	0.10	0.1
	Wetland Area	0.057	0.074	0.432	0.012	1.0	0.37	0.01	0.10	0.1
	WWTP	0.270	0.024	0.432	0.012	1.0	0.37	0.01	0.10	0.1
	Fly Ash Pile	0.360	0.025	0.432	0.012	1.0	0.37	0.01	0.10	0.1
Nickel	Reference	10.0	0.76	0.432	0.012	1.0	0.37	0.17	625.00	0.0
	Wetland Area	15.0	0.47	0.432	0.012	1.0	0.37	0.14	625.00	0.0
	WWTP	10.0	0.48	0.432	0.012	1.0	0.37	0.12	625.00	0.0
	Fly Ash Pile	18.0	0.47	0.432	0.012	1.0	0.37	0.16	625.00	0.0
Zinc	Reference	94.0	67.0	0.432	0.012	1.0	0.37	11.13	250.00	0.0
	Wetland Area	46.0	40.0	0.432	0.012	1.0	0.37	6.60	250.00	0.0
	WWTP	568.0	31.0	0.432	0.012	1.0	0.37	7.48	250.00	0.0
	Fly Ash Pile	22.0	34.0	0.432	0.012	1.0	0.37	5.53	250.00	0.0
PCBs	Reference	0.008	0.064	0.432	0.012	1.0	0.37	0.01	0.13	0.1
	Wetland Area	0.008	2.000	0.432	0.012	1.0	0.37	0.32	0.13	2.5
	WWTP	0.008	0.210	0.432	0.012	1.0	0.37	0.03	0.13	0.3
	Fly Ash Pile	0.008	0.260	0.432	0.012	1.0	0.37	0.04	0.13	0.3

Notes:
1) All concentrations in mg/kg, wet weight
2) Small mammal concentrations represent a max. value based on all animals collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in small mammals represents the total Aroclor 1254 and 1260 found in all animals
6) The soil concentration is based on a single soil sample collected from each area

Table 52. Hazard Quotient Calculations for Mink
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Mean Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/0.52 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	
Arsenic	Reference No. 2	2.10	0.0011	0.062	0.114	0.0002	0.057	1.0	1.90	0.01	0.15	0.1
	Outfall 001 (BMI-1)	3.30	0.0011	0.086	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
	Outfall 002 (BMI-2)	1.80	0.0011	0.078	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
	Outfall 004 (BMI-4)	2.80	0.0011	0.078	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
	Downstream (BMI-6)	0.94	0.0000	0.070	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
Cadmium	Reference No. 2	0.11	0.0015	0.09	0.114	0.0002	0.057	1.0	1.90	0.02	0.75	0.0
	Outfall 001 (BMI-1)	0.18	0.0015	0.12	0.114	0.0002	0.057	1.0	1.90	0.03	0.75	0.0
	Outfall 002 (BMI-2)	0.17	0.0015	0.12	0.114	0.0002	0.057	1.0	1.90	0.03	0.75	0.0
	Outfall 004 (BMI-4)	0.12	0.0015	0.12	0.114	0.0002	0.057	1.0	1.90	0.03	0.75	0.0
	Downstream (BMI-6)	0.16	0.0000	0.12	0.114	0.0002	0.057	1.0	1.90	0.03	0.75	0.0
Chromium	Reference No. 2	13.00	0.0025	0.39	0.114	0.0002	0.057	1.0	1.90	0.09	0.17	0.5
	Outfall 001 (BMI-1)	8.30	0.0025	0.35	0.114	0.0002	0.057	1.0	1.90	0.08	0.17	0.5
	Outfall 002 (BMI-2)	7.90	0.0025	0.35	0.114	0.0002	0.057	1.0	1.90	0.08	0.17	0.5
	Outfall 004 (BMI-4)	11.50	0.0025	0.36	0.114	0.0002	0.057	1.0	1.90	0.08	0.17	0.5
	Downstream (BMI-6)	6.90	0.0000	0.34	0.114	0.0002	0.057	1.0	1.90	0.08	0.17	0.5
Copper	Reference No. 2	12.30	0.0025	0.45	0.114	0.0002	0.057	1.0	1.90	0.10	1.00	0.1
	Outfall 001 (BMI-1)	5.50	0.0025	1.10	0.114	0.0002	0.057	1.0	1.90	0.24	1.00	0.2
	Outfall 002 (BMI-2)	4.80	0.0025	0.73	0.114	0.0002	0.057	1.0	1.90	0.16	1.00	0.2
	Outfall 004 (BMI-4)	4.50	0.0025	0.75	0.114	0.0002	0.057	1.0	1.90	0.16	1.00	0.2
	Downstream (BMI-6)	3.00	0.0000	0.81	0.114	0.0002	0.057	1.0	1.90	0.18	1.00	0.2
Lead	Reference No. 2	12.30	0.0011	0.07	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
	Outfall 001 (BMI-1)	12.00	0.0011	0.078	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
	Outfall 002 (BMI-2)	7.30	0.0011	0.078	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
	Outfall 004 (BMI-4)	4.50	0.0011	0.10	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.2
	Downstream (BMI-6)	5.30	0.0000	0.07	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
Mercury	Reference No. 2	0.49	0.0001	0.19	0.114	0.0002	0.057	1.0	1.90	0.04	0.027	[illegible]
	Outfall 001 (BMI-1)	0.14	0.0001	0.21	0.114	0.0002	0.057	1.0	1.90	0.05	0.027	[illegible]
	Outfall 002 (BMI-2)	0.12	0.0001	0.22	0.114	0.0002	0.057	1.0	1.90	0.05	0.027	[illegible]
	Outfall 004 (BMI-4)	0.032	0.0001	0.19	0.114	0.0002	0.057	1.0	1.90	0.04	0.027	1.5
	Downstream (BMI-6)	0.05	0.0000	0.19	0.114	0.0002	0.057	1.0	1.90	0.04	0.027	1.5
Nickel	Reference No. 2	8.40	0.0050	0.31	0.114	0.0002	0.057	1.0	1.90	0.07	62.50	0.0
	Outfall 001 (BMI-1)	4.90	0.0050	0.38	0.114	0.0002	0.057	1.0	1.90	0.08	62.50	0.0
	Outfall 002 (BMI-2)	4.50	0.0050	0.38	0.114	0.0002	0.057	1.0	1.90	0.08	62.50	0.0
	Outfall 004 (BMI-4)	4.20	0.0050	0.39	0.114	0.0002	0.057	1.0	1.90	0.09	62.50	0.0
	Downstream (BMI-6)	3.60	0.0000	0.36	0.114	0.0002	0.057	1.0	1.90	0.08	62.50	0.0
Zinc	Reference No. 2	44.00	0.0025	19.00	0.114	0.0002	0.057	1.0	1.90	4.13	25.00	0.2
	Outfall 001 (BMI-1)	33.00	0.0025	19.00	0.114	0.0002	0.057	1.0	1.90	4.13	25.00	0.2
	Outfall 002 (BMI-2)	30.00	0.0025	19.00	0.114	0.0002	0.057	1.0	1.90	4.13	25.00	0.2
	Outfall 004 (BMI-4)	29.00	0.0025	20.00	0.114	0.0002	0.057	1.0	1.90	4.34	25.00	0.2
	Downstream (BMI-6)	25.00	0.0000	21.00	0.114	0.0002	0.057	1.0	1.90	4.56	25.00	0.2
PCBs (Total)	Reference No. 2	0.0083	0.00003	0.076	0.114	0.0002	0.057	1.0	1.90	0.02	0.10	0.2
	Outfall 001 (BMI-1)	0.0082	0.00003	0.089	0.114	0.0002	0.057	1.0	1.90	0.02	0.10	0.2
	Outfall 002 (BMI-2)	0.0083	0.00003	0.21	0.114	0.0002	0.057	1.0	1.90	0.05	0.10	0.5
	Outfall 004 (BMI-4)	0.0084	0.00003	0.49	0.114	0.0002	0.057	1.0	1.90	0.11	0.10	1.1
	Downstream (BMI-6)	0.0082	0.00000	2.50	0.114	0.0002	0.057	1.0	1.90	0.54	0.10	5.4

Notes.
1) All concentrations in mg/kg, wet weight
2) Tissue concentrations represent a mean value for all fish or clams collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in tissue represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) Model assumes a diet of 100% fish

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Table 52 (cont'd.). Hazard Quotient Calculations for Mink
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Mean Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/0.52 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.0011	0.062	0.114	0.0002	0.057	1.0	1.90	0.01	1.50	0.0
	Outfall 001 (BMI-1)	3.30	0.0011	0.086	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Outfall 002 (BMI-2)	1.80	0.0011	0.078	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Outfall 004 (BMI-4)	2.80	0.0011	0.078	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Downstream (BMI-6)	0.94	0.0000	0.070	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
Cadmium	Reference No. 2	0.11	0.0015	0.09	0.114	0.0002	0.057	1.0	1.90	0.02	7.50	0.0
	Outfall 001 (BMI-1)	0.18	0.0015	0.12	0.114	0.0002	0.057	1.0	1.90	0.03	7.50	0.0
	Outfall 002 (BMI-2)	0.17	0.0015	0.12	0.114	0.0002	0.057	1.0	1.90	0.03	7.50	0.0
	Outfall 004 (BMI-4)	0.12	0.0015	0.12	0.114	0.0002	0.057	1.0	1.90	0.03	7.50	0.0
	Downstream (BMI-6)	0.16	0.0000	0.12	0.114	0.0002	0.057	1.0	1.90	0.03	7.50	0.0
Chromium	Reference No. 2	13.00	0.0025	0.39	0.114	0.0002	0.057	1.0	1.90	0.09	1.70	0.1
	Outfall 001 (BMI-1)	8.30	0.0025	0.35	0.114	0.0002	0.057	1.0	1.90	0.08	1.70	0.0
	Outfall 002 (BMI-2)	7.90	0.0025	0.35	0.114	0.0002	0.057	1.0	1.90	0.08	1.70	0.0
	Outfall 004 (BMI-4)	11.50	0.0025	0.36	0.114	0.0002	0.057	1.0	1.90	0.08	1.70	0.0
	Downstream (BMI-6)	6.90	0.0000	0.34	0.114	0.0002	0.057	1.0	1.90	0.08	1.70	0.0
Copper	Reference No. 2	12.30	0.0025	0.45	0.114	0.0002	0.057	1.0	1.90	0.10	10.00	0.0
	Outfall 001 (BMI-1)	5.50	0.0025	1.10	0.114	0.0002	0.057	1.0	1.90	0.24	10.00	0.0
	Outfall 002 (BMI-2)	4.80	0.0025	0.73	0.114	0.0002	0.057	1.0	1.90	0.16	10.00	0.0
	Outfall 004 (BMI-4)	4.50	0.0025	0.75	0.114	0.0002	0.057	1.0	1.90	0.16	10.00	0.0
	Downstream (BMI-6)	3.00	0.0000	0.81	0.114	0.0002	0.057	1.0	1.90	0.18	10.00	0.0
Lead	Reference No. 2	12.30	0.0011	0.07	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Outfall 001 (BMI-1)	12.00	0.0011	0.078	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Outfall 002 (BMI-2)	7.30	0.0011	0.078	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Outfall 004 (BMI-4)	4.50	0.0011	0.10	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Downstream (BMI-6)	5.30	0.0000	0.07	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
Mercury	Reference No. 2	0.49	0.0001	0.19	0.114	0.0002	0.057	1.0	1.90	0.04	0.270	0.2
	Outfall 001 (BMI-1)	0.14	0.0001	0.21	0.114	0.0002	0.057	1.0	1.90	0.05	0.270	0.2
	Outfall 002 (BMI-2)	0.12	0.0001	0.22	0.114	0.0002	0.057	1.0	1.90	0.05	0.270	0.2
	Outfall 004 (BMI-4)	0.032	0.0001	0.19	0.114	0.0002	0.057	1.0	1.90	0.04	0.270	0.2
	Downstream (BMI-6)	0.05	0.0000	0.19	0.114	0.0002	0.057	1.0	1.90	0.04	0.270	0.2
Nickel	Reference No. 2	8.40	0.0050	0.31	0.114	0.0002	0.057	1.0	1.90	0.07	625.00	0.0
	Outfall 001 (BMI-1)	4.90	0.0050	0.38	0.114	0.0002	0.057	1.0	1.90	0.08	625.00	0.0
	Outfall 002 (BMI-2)	4.50	0.0050	0.38	0.114	0.0002	0.057	1.0	1.90	0.08	625.00	0.0
	Outfall 004 (BMI-4)	4.20	0.0050	0.39	0.114	0.0002	0.057	1.0	1.90	0.09	625.00	0.0
	Downstream (BMI-6)	3.60	0.0000	0.36	0.114	0.0002	0.057	1.0	1.90	0.08	625.00	0.0
Zinc	Reference No. 2	44.00	0.0025	19.00	0.114	0.0002	0.057	1.0	1.90	4.13	250.00	0.0
	Outfall 001 (BMI-1)	33.00	0.0025	19.00	0.114	0.0002	0.057	1.0	1.90	4.13	250.00	0.0
	Outfall 002 (BMI-2)	30.00	0.0025	19.00	0.114	0.0002	0.057	1.0	1.90	4.13	250.00	0.0
	Outfall 004 (BMI-4)	29.00	0.0025	20.00	0.114	0.0002	0.057	1.0	1.90	4.34	250.00	0.0
	Downstream (BMI-6)	25.00	0.0000	21.00	0.114	0.0002	0.057	1.0	1.90	4.56	250.00	0.0
PCBs (Total)	Reference No. 2	0.0083	0.00003	0.076	0.114	0.0002	0.057	1.0	1.90	0.02	0.13	0.1
	Outfall 001 (BMI-1)	0.0082	0.00003	0.089	0.114	0.0002	0.057	1.0	1.90	0.02	0.13	0.1
	Outfall 002 (BMI-2)	0.0083	0.00003	0.21	0.114	0.0002	0.057	1.0	1.90	0.05	0.13	0.3
	Outfall 004 (BMI-4)	0.0084	0.00003	0.49	0.114	0.0002	0.057	1.0	1.90	0.11	0.13	0.8
	Downstream (BMI-6)	0.0082	0.00000	2.50	0.114	0.0002	0.057	1.0	1.90	0.54	0.13	4.2

Notes
1) All concentrations in mg/kg, wet weight
2) Tissue concentrations represent a mean value for all fish or clams collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in tissue represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) Model assumes a diet of 100% fish

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Table 52 (cont'd.). Hazard Quotient Calculations for Mink
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Max. Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/0.52 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.0011	0.076	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
	Outfall 001 (BMI-1)	3.30	0.0011	0.150	0.114	0.0002	0.057	1.0	1.90	0.03	0.15	0.2
	Outfall 002 (BMI-2)	1.80	0.0011	0.100	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
	Outfall 004 (BMI-4)	2.80	0.0011	0.094	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
	Downstream (BMI-6)	0.94	0.0000	0.100	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.1
Cadmium	Reference No. 2	0.11	0.0015	0.12	0.114	0.0002	0.057	1.0	1.90	0.03	0.75	0.0
	Outfall 001 (BMI-1)	0.18	0.0015	0.14	0.114	0.0002	0.057	1.0	1.90	0.03	0.75	0.0
	Outfall 002 (BMI-2)	0.17	0.0015	0.15	0.114	0.0002	0.057	1.0	1.90	0.03	0.75	0.0
	Outfall 004 (BMI-4)	0.12	0.0015	0.15	0.114	0.0002	0.057	1.0	1.90	0.03	0.75	0.0
	Downstream (BMI-6)	0.16	0.0000	0.16	0.114	0.0002	0.057	1.0	1.90	0.03	0.75	0.0
Chromium	Reference No. 2	13.00	0.0025	0.70	0.114	0.0002	0.057	1.0	1.90	0.16	0.17	0.9
	Outfall 001 (BMI-1)	8.30	0.0025	0.57	0.114	0.0002	0.057	1.0	1.90	0.13	0.17	0.7
	Outfall 002 (BMI-2)	7.90	0.0025	0.73	0.114	0.0002	0.057	1.0	1.90	0.16	0.17	0.9
	Outfall 004 (BMI-4)	11.50	0.0025	0.60	0.114	0.0002	0.057	1.0	1.90	0.13	0.17	0.8
	Downstream (BMI-6)	6.90	0.0000	0.47	0.114	0.0002	0.057	1.0	1.90	0.10	0.17	0.6
Copper	Reference No. 2	12.30	0.0025	0.81	0.114	0.0002	0.057	1.0	1.90	0.18	1.00	0.2
	Outfall 001 (BMI-1)	5.50	0.0025	4.60	0.114	0.0002	0.057	1.0	1.90	1.00	1.00	1.0
	Outfall 002 (BMI-2)	4.80	0.0025	1.10	0.114	0.0002	0.057	1.0	1.90	0.24	1.00	0.2
	Outfall 004 (BMI-4)	4.50	0.0025	1.40	0.114	0.0002	0.057	1.0	1.90	0.31	1.00	0.3
	Downstream (BMI-6)	3.00	0.0000	1.50	0.114	0.0002	0.057	1.0	1.90	0.33	1.00	0.3
Lead	Reference No. 2	12.30	0.0011	0.14	0.114	0.0002	0.057	1.0	1.90	0.04	0.15	0.2
	Outfall 001 (BMI-1)	12.00	0.0011	0.092	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.2
	Outfall 002 (BMI-2)	7.30	0.0011	0.100	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.2
	Outfall 004 (BMI-4)	4.50	0.0011	0.25	0.114	0.0002	0.057	1.0	1.90	0.06	0.15	0.4
	Downstream (BMI-6)	5.30	0.0000	0.10	0.114	0.0002	0.057	1.0	1.90	0.02	0.15	0.2
Mercury	Reference No. 2	0.49	0.0001	0.27	0.114	0.0002	0.057	1.0	1.90	0.06	0.027	[illegible]
	Outfall 001 (BMI-1)	0.14	0.0001	0.27	0.114	0.0002	0.057	1.0	1.90	0.06	0.027	[illegible]
	Outfall 002 (BMI-2)	0.12	0.0001	0.26	0.114	0.0002	0.057	1.0	1.90	0.06	0.027	[illegible]
	Outfall 004 (BMI-4)	0.032	0.0001	0.27	0.114	0.0002	0.057	1.0	1.90	0.06	0.027	2.2
	Downstream (BMI-6)	0.05	0.0000	0.27	0.114	0.0002	0.057	1.0	1.90	0.06	0.027	2.2
Nickel	Reference No. 2	8.40	0.0050	0.39	0.114	0.0002	0.057	1.0	1.90	0.09	62.50	0.0
	Outfall 001 (BMI-1)	4.90	0.0050	0.46	0.114	0.0002	0.057	1.0	1.90	0.10	62.50	0.0
	Outfall 002 (BMI-2)	4.50	0.0050	0.51	0.114	0.0002	0.057	1.0	1.90	0.11	62.50	0.0
	Outfall 004 (BMI-4)	4.20	0.0050	0.47	0.114	0.0002	0.057	1.0	1.90	0.10	62.50	0.0
	Downstream (BMI-6)	3.60	0.0000	0.52	0.114	0.0002	0.057	1.0	1.90	0.11	62.50	0.0
Zinc	Reference No. 2	44.00	0.0025	22.00	0.114	0.0002	0.057	1.0	1.90	4.78	25.00	0.2
	Outfall 001 (BMI-1)	33.00	0.0025	23.00	0.114	0.0002	0.057	1.0	1.90	4.99	25.00	0.2
	Outfall 002 (BMI-2)	30.00	0.0025	24.00	0.114	0.0002	0.057	1.0	1.90	5.21	25.00	0.2
	Outfall 004 (BMI-4)	29.00	0.0025	24.00	0.114	0.0002	0.057	1.0	1.90	5.21	25.00	0.2
	Downstream (BMI-6)	25.00	0.0000	27.00	0.114	0.0002	0.057	1.0	1.90	5.86	25.00	0.2
PCBs (Tot	Reference No. 2	0.0083	0.00003	0.140	0.114	0.0002	0.057	1.0	1.90	0.03	0.10	0.3
	Outfall 001 (BMI-1)	0.0082	0.00003	0.140	0.114	0.0002	0.057	1.0	1.90	0.03	0.10	0.3
	Outfall 002 (BMI-2)	0.0083	0.00003	1.00	0.114	0.0002	0.057	1.0	1.90	0.22	0.10	2.2
	Outfall 004 (BMI-4)	0.0084	0.00003	1.10	0.114	0.0002	0.057	1.0	1.90	0.24	0.10	2.4
	Downstream (BMI-6)	0.0082	0.00000	4.20	0.114	0.0002	0.057	1.0	1.90	0.91	0.10	9.1

Notes
1) All concentrations in mg/kg, wet weight
2) Tissue concentrations represent a maximum value for all fish collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in tissue represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) Model assumes a diet of 100% fish

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Table 52 (cont'd.). Hazard Quotient Calculations for Mink
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Max. Conc. in Fish (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/0.52 kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.0011	0.076	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Outfall 001 (BMI-1)	3.30	0.0011	0.150	0.114	0.0002	0.057	1.0	1.90	0.03	1.50	0.0
	Outfall 002 (BMI-2)	1.80	0.0011	0.100	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Outfall 004 (BMI-4)	2.80	0.0011	0.094	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Downstream (BMI-6)	0.94	0.0000	0.100	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
Cadmium	Reference No. 2	0.11	0.0015	0.12	0.114	0.0002	0.057	1.0	1.90	0.03	7.50	0.0
	Outfall 001 (BMI-1)	0.18	0.0015	0.14	0.114	0.0002	0.057	1.0	1.90	0.03	7.50	0.0
	Outfall 002 (BMI-2)	0.17	0.0015	0.15	0.114	0.0002	0.057	1.0	1.90	0.03	7.50	0.0
	Outfall 004 (BMI-4)	0.12	0.0015	0.15	0.114	0.0002	0.057	1.0	1.90	0.03	7.50	0.0
	Downstream (BMI-6)	0.16	0.0000	0.16	0.114	0.0002	0.057	1.0	1.90	0.03	7.50	0.0
Chromium	Reference No. 2	13.00	0.0025	0.70	0.114	0.0002	0.057	1.0	1.90	0.16	1.70	0.1
	Outfall 001 (BMI-1)	8.30	0.0025	0.57	0.114	0.0002	0.057	1.0	1.90	0.13	1.70	0.1
	Outfall 002 (BMI-2)	7.90	0.0025	0.73	0.114	0.0002	0.057	1.0	1.90	0.16	1.70	0.1
	Outfall 004 (BMI-4)	11.50	0.0025	0.60	0.114	0.0002	0.057	1.0	1.90	0.13	1.70	0.1
	Downstream (BMI-6)	6.90	0.0000	0.47	0.114	0.0002	0.057	1.0	1.90	0.10	1.70	0.1
Copper	Reference No. 2	12.30	0.0025	0.81	0.114	0.0002	0.057	1.0	1.90	0.18	10.00	0.0
	Outfall 001 (BMI-1)	5.50	0.0025	4.60	0.114	0.0002	0.057	1.0	1.90	1.00	10.00	0.1
	Outfall 002 (BMI-2)	4.80	0.0025	1.10	0.114	0.0002	0.057	1.0	1.90	0.24	10.00	0.0
	Outfall 004 (BMI-4)	4.50	0.0025	1.40	0.114	0.0002	0.057	1.0	1.90	0.31	10.00	0.0
	Downstream (BMI-6)	3.00	0.0000	1.50	0.114	0.0002	0.057	1.0	1.90	0.33	10.00	0.0
Lead	Reference No. 2	12.30	0.0011	0.14	0.114	0.0002	0.057	1.0	1.90	0.04	1.50	0.0
	Outfall 001 (BMI-1)	12.00	0.0011	0.092	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Outfall 002 (BMI-2)	7.30	0.0011	0.100	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
	Outfall 004 (BMI-4)	4.50	0.0011	0.25	0.114	0.0002	0.057	1.0	1.90	0.06	1.50	0.0
	Downstream (BMI-6)	5.30	0.0000	0.10	0.114	0.0002	0.057	1.0	1.90	0.02	1.50	0.0
Mercury	Reference No. 2	0.49	0.0001	0.27	0.114	0.0002	0.057	1.0	1.90	0.06	0.270	0.2
	Outfall 001 (BMI-1)	0.14	0.0001	0.27	0.114	0.0002	0.057	1.0	1.90	0.06	0.270	0.2
	Outfall 002 (BMI-2)	0.12	0.0001	0.26	0.114	0.0002	0.057	1.0	1.90	0.06	0.270	0.2
	Outfall 004 (BMI-4)	0.032	0.0001	0.27	0.114	0.0002	0.057	1.0	1.90	0.06	0.270	0.2
	Downstream (BMI-6)	0.05	0.0000	0.27	0.114	0.0002	0.057	1.0	1.90	0.06	0.270	0.2
Nickel	Reference No. 2	8.40	0.0050	0.39	0.114	0.0002	0.057	1.0	1.90	0.09	625.00	0.0
	Outfall 001 (BMI-1)	4.90	0.0050	0.46	0.114	0.0002	0.057	1.0	1.90	0.10	625.00	0.0
	Outfall 002 (BMI-2)	4.50	0.0050	0.51	0.114	0.0002	0.057	1.0	1.90	0.11	625.00	0.0
	Outfall 004 (BMI-4)	4.20	0.0050	0.47	0.114	0.0002	0.057	1.0	1.90	0.10	625.00	0.0
	Downstream (BMI-6)	3.60	0.0000	0.52	0.114	0.0002	0.057	1.0	1.90	0.11	625.00	0.0
Zinc	Reference No. 2	44.00	0.0025	22.00	0.114	0.0002	0.057	1.0	1.90	4.78	250.00	0.0
	Outfall 001 (BMI-1)	33.00	0.0025	23.00	0.114	0.0002	0.057	1.0	1.90	4.99	250.00	0.0
	Outfall 002 (BMI-2)	30.00	0.0025	24.00	0.114	0.0002	0.057	1.0	1.90	5.21	250.00	0.0
	Outfall 004 (BMI-4)	29.00	0.0025	24.00	0.114	0.0002	0.057	1.0	1.90	5.21	250.00	0.0
	Downstream (BMI-6)	25.00	0.0000	27.00	0.114	0.0002	0.057	1.0	1.90	5.86	250.00	0.0
PCBs (Tot	Reference No. 2	0.0083	0.00003	0.140	0.114	0.0002	0.057	1.0	1.90	0.03	0.13	0.2
	Outfall 001 (BMI-1)	0.0082	0.00003	0.140	0.114	0.0002	0.057	1.0	1.90	0.03	0.13	0.2
	Outfall 002 (BMI-2)	0.0083	0.00003	1.00	0.114	0.0002	0.057	1.0	1.90	0.22	0.13	1.7
	Outfall 004 (BMI-4)	0.0084	0.00003	1.10	0.114	0.0002	0.057	1.0	1.90	0.24	0.13	1.8
	Downstream (BMI-6)	0.0082	0.00000	4.20	0.114	0.0002	0.057	1.0	1.90	0.91	0.13	7.0

Notes:
1) All concentrations in mg/kg, wet weight
2) Tissue concentrations represent a maximum value for all fish collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in tissue represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) Model assumes a diet of 100% fish

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Table 53. Hazard Quotient Calculations for Raccoon
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc (mg/L)	Mean Conc. in Fish (mg/kg)	Mean Conc. in Clams (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/2.0 kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.0011	0.062	0.51	0.50	0.047	0.18	1.0	0.50	0.09	0.15	0.6
	Outfall 001 (BMI-1)	3.30	0.0011	0.086	0.63	0.50	0.047	0.18	1.0	0.50	0.13	0.15	0.8
	Outfall 002 (BMI-2)	1.80	0.0011	0.078	0.68	0.50	0.047	0.18	1.0	0.50	0.09	0.15	0.6
	Outfall 004 (BMI-4)	2.80	0.0011	0.078	0.65	0.50	0.047	0.18	1.0	0.50	0.11	0.15	0.8
	Downstream (BMI-6)	0.94	0.0000	0.070	0.77	0.50	0.047	0.18	1.0	0.50	0.07	0.15	0.5
Cadmium	Reference No. 2	0.11	0.0015	0.09	0.096	0.50	0.047	0.18	1.0	0.50	0.03	0.75	0.0
	Outfall 001 (BMI-1)	0.18	0.0015	0.12	0.10	0.50	0.047	0.18	1.0	0.50	0.03	0.75	0.0
	Outfall 002 (BMI-2)	0.17	0.0015	0.12	0.09	0.50	0.047	0.18	1.0	0.50	0.03	0.75	0.0
	Outfall 004 (BMI-4)	0.12	0.0015	0.12	0.12	0.50	0.047	0.18	1.0	0.50	0.03	0.75	0.0
	Downstream (BMI-6)	0.16	0.0000	0.12	0.11	0.50	0.047	0.18	1.0	0.50	0.03	0.75	0.0
Chromium	Reference No. 2	13.00	0.0025	0.39	0.43	0.50	0.047	0.18	1.0	0.50	0.41	0.17	2.4
	Outfall 001 (BMI-1)	8.30	0.0025	0.35	0.25	0.50	0.047	0.18	1.0	0.50	0.28	0.17	1.6
	Outfall 002 (BMI-2)	7.90	0.0025	0.35	0.28	0.50	0.047	0.18	1.0	0.50	0.27	0.17	1.6
	Outfall 004 (BMI-4)	11.50	0.0025	0.36	0.57	0.50	0.047	0.18	1.0	0.50	0.37	0.17	2.2
	Downstream (BMI-6)	6.90	0.0000	0.34	0.77	0.50	0.047	0.18	1.0	0.50	0.27	0.17	1.6
Copper	Reference No. 2	12.30	0.0025	0.45	5.90	0.50	0.047	0.18	1.0	0.50	0.67	1.00	0.7
	Outfall 001 (BMI-1)	5.50	0.0025	1.10	6.30	0.50	0.047	0.18	1.0	0.50	0.66	1.00	0.7
	Outfall 002 (BMI-2)	4.80	0.0025	0.73	7.60	0.50	0.047	0.18	1.0	0.50	0.64	1.00	0.6
	Outfall 004 (BMI-4)	4.50	0.0025	0.75	5.30	0.50	0.047	0.18	1.0	0.50	0.52	1.00	0.5
	Downstream (BMI-6)	3.00	0.0000	0.81	7.90	0.50	0.047	0.18	1.0	0.50	0.63	1.00	0.6
Lead	Reference No. 2	12.30	0.0011	0.07	0.14	0.50	0.047	0.18	1.0	0.50	0.31	0.15	2.1
	Outfall 001 (BMI-1)	12.00	0.0011	0.078	0.070	0.50	0.047	0.18	1.0	0.50	0.30	0.15	2.0
	Outfall 002 (BMI-2)	7.30	0.0011	0.078	0.09	0.50	0.047	0.18	1.0	0.50	0.19	0.15	1.3
	Outfall 004 (BMI-4)	4.50	0.0011	0.10	0.08	0.50	0.047	0.18	1.0	0.50	0.13	0.15	0.9
	Downstream (BMI-6)	5.30	0.0000	0.07	0.072	0.50	0.047	0.18	1.0	0.50	0.14	0.15	0.9
Mercury	Reference No. 2	0.49	0.0001	0.19	0.15	0.50	0.047	0.18	1.0	0.50	0.06	0.01	5.7
	Outfall 001 (BMI-1)	0.14	0.0001	0.21	0.14	0.50	0.047	0.18	1.0	0.50	0.05	0.01	5.2
	Outfall 002 (BMI-2)	0.12	0.0001	0.22	0.18	0.50	0.047	0.18	1.0	0.50	0.06	0.01	5.6
	Outfall 004 (BMI-4)	0.032	0.0001	0.19	0.09	0.50	0.047	0.18	1.0	0.50	0.04	0.01	4.3
	Downstream (BMI-6)	0.05	0.0000	0.19	0.13	0.50	0.047	0.18	1.0	0.50	0.05	0.01	4.6
Nickel	Reference No. 2	8.40	0.0050	0.31	0.32	0.50	0.047	0.18	1.0	0.50	0.28	62.50	0
	Outfall 001 (BMI-1)	4.90	0.0050	0.38	0.34	0.50	0.047	0.18	1.0	0.50	0.21	62.50	0
	Outfall 002 (BMI-2)	4.50	0.0050	0.38	0.30	0.50	0.047	0.18	1.0	0.50	0.20	62.50	0.0
	Outfall 004 (BMI-4)	4.20	0.0050	0.39	0.40	0.50	0.047	0.18	1.0	0.50	0.20	62.50	0.0
	Downstream (BMI-6)	3.60	0.0000	0.36	0.36	0.50	0.047	0.18	1.0	0.50	0.17	62.50	0.0
Zinc	Reference No. 2	44.00	0.0025	19.00	26.00	0.50	0.047	0.18	1.0	0.50	6.13	25.00	0.2
	Outfall 001 (BMI-1)	33.00	0.0025	19.00	23.00	0.50	0.047	0.18	1.0	0.50	5.73	25.00	0.2
	Outfall 002 (BMI-2)	30.00	0.0025	19.00	20.00	0.50	0.047	0.18	1.0	0.50	5.51	25.00	0.2
	Outfall 004 (BMI-4)	29.00	0.0025	20.00	29.00	0.50	0.047	0.18	1.0	0.50	6.13	25.00	0.2
	Downstream (BMI-6)	25.00	0.0000	21.00	22.00	0.50	0.047	0.18	1.0	0.50	5.89	25.00	0.2
PCBs (Total)	Reference No. 2	0.0083	0.00003	0.076	0.022	0.50	0.047	0.18	1.0	0.50	0.02	0.10	0.2
	Outfall 001 (BMI-1)	0.0082	0.00003	0.089	0.016	0.50	0.047	0.18	1.0	0.50	0.02	0.10	0.2
	Outfall 002 (BMI-2)	0.0083	0.00003	0.21	0.019	0.50	0.047	0.18	1.0	0.50	0.04	0.10	0.4
	Outfall 004 (BMI-4)	0.0084	0.00003	0.49	0.590	0.50	0.047	0.18	1.0	0.50	0.13	0.10	1.3
	Downstream (BMI-6)	0.0082	0.00000	2.50	0.019	0.50	0.047	0.18	1.0	0.50	0.50	0.10	5.0

Notes
1) All concentrations in mg/kg, wet weight
2) Tissue concentrations represent a mean value for all fish or clams collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in tissue represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) Model assumes a diet of 80% fish and 20% clams

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Table 53 (cont'd.). Hazard Quotient Calculations for Raccoon
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Mean Conc. in Fish (mg/kg)	Mean Conc. in Clams (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.0011	0.062	0.51	0.50	0.047	0.18	1.0	0.50	0.09	1.50	0.1
	Outfall 001 (BMI-1)	3.30	0.0011	0.086	0.63	0.50	0.047	0.18	1.0	0.50	0.13	1.50	0.1
	Outfall 002 (BMI-2)	1.80	0.0011	0.078	0.68	0.50	0.047	0.18	1.0	0.50	0.09	1.50	0.1
	Outfall 004 (BMI-4)	2.80	0.0011	0.078	0.65	0.50	0.047	0.18	1.0	0.50	0.11	1.50	0.1
	Downstream (BMI-6)	0.94	0.0000	0.070	0.77	0.50	0.047	0.18	1.0	0.50	0.07	1.50	0.0
Cadmium	Reference No. 2	0.11	0.0015	0.09	0.096	0.50	0.047	0.18	1.0	0.50	0.03	7.50	0.0
	Outfall 001 (BMI-1)	0.18	0.0015	0.12	0.10	0.50	0.047	0.18	1.0	0.50	0.03	7.50	0.0
	Outfall 002 (BMI-2)	0.17	0.0015	0.12	0.09	0.50	0.047	0.18	1.0	0.50	0.03	7.50	0.0
	Outfall 004 (BMI-4)	0.12	0.0015	0.12	0.12	0.50	0.047	0.18	1.0	0.50	0.03	7.50	0.0
	Downstream (BMI-6)	0.16	0.0000	0.12	0.11	0.50	0.047	0.18	1.0	0.50	0.03	7.50	0.0
Chromium	Reference No. 2	13.00	0.0025	0.39	0.43	0.50	0.047	0.18	1.0	0.50	0.41	1.70	0.2
	Outfall 001 (BMI-1)	8.30	0.0025	0.35	0.25	0.50	0.047	0.18	1.0	0.50	0.28	1.70	0.2
	Outfall 002 (BMI-2)	7.90	0.0025	0.35	0.28	0.50	0.047	0.18	1.0	0.50	0.27	1.70	0.2
	Outfall 004 (BMI-4)	11.50	0.0025	0.36	0.57	0.50	0.047	0.18	1.0	0.50	0.37	1.70	0.2
	Downstream (BMI-6)	6.90	0.0000	0.34	0.77	0.50	0.047	0.18	1.0	0.50	0.27	1.70	0.2
Copper	Reference No. 2	12.30	0.0025	0.45	5.90	0.50	0.047	0.18	1.0	0.50	0.67	10.00	0.1
	Outfall 001 (BMI-1)	5.50	0.0025	1.10	6.30	0.50	0.047	0.18	1.0	0.50	0.66	10.00	0.1
	Outfall 002 (BMI-2)	4.80	0.0025	0.73	7.60	0.50	0.047	0.18	1.0	0.50	0.64	10.00	0.1
	Outfall 004 (BMI-4)	4.50	0.0025	0.75	5.30	0.50	0.047	0.18	1.0	0.50	0.52	10.00	0.1
	Downstream (BMI-6)	3.00	0.0000	0.81	7.90	0.50	0.047	0.18	1.0	0.50	0.63	10.00	0.1
Lead	Reference No. 2	12.30	0.0011	0.07	0.14	0.50	0.047	0.18	1.0	0.50	0.31	1.50	0.2
	Outfall 001 (BMI-1)	12.00	0.0011	0.078	0.070	0.50	0.047	0.18	1.0	0.50	0.30	1.50	0.2
	Outfall 002 (BMI-2)	7.30	0.0011	0.078	0.09	0.50	0.047	0.18	1.0	0.50	0.19	1.50	0.1
	Outfall 004 (BMI-4)	4.50	0.0011	0.10	0.08	0.50	0.047	0.18	1.0	0.50	0.13	1.50	0.1
	Downstream (BMI-6)	5.30	0.0000	0.07	0.072	0.50	0.047	0.18	1.0	0.50	0.14	1.50	0.1
Mercury	Reference No. 2	0.49	0.0001	0.19	0.15	0.50	0.047	0.18	1.0	0.50	0.06	0.1	0.6
	Outfall 001 (BMI-1)	0.14	0.0001	0.21	0.14	0.50	0.047	0.18	1.0	0.50	0.05	0.1	0.5
	Outfall 002 (BMI-2)	0.12	0.0001	0.22	0.18	0.50	0.047	0.18	1.0	0.50	0.06	0.1	0.6
	Outfall 004 (BMI-4)	0.032	0.0001	0.19	0.09	0.50	0.047	0.18	1.0	0.50	0.04	0.1	0.4
	Downstream (BMI-6)	0.05	0.0000	0.19	0.13	0.50	0.047	0.18	1.0	0.50	0.05	0.1	0.5
Nickel	Reference No. 2	8.40	0.0050	0.31	0.32	0.50	0.047	0.18	1.0	0.50	0.28	625.00	0.0
	Outfall 001 (BMI-1)	4.90	0.0050	0.38	0.34	0.50	0.047	0.18	1.0	0.50	0.21	625.00	0.0
	Outfall 002 (BMI-2)	4.50	0.0050	0.38	0.30	0.50	0.047	0.18	1.0	0.50	0.20	625.00	0.0
	Outfall 004 (BMI-4)	4.20	0.0050	0.39	0.40	0.50	0.047	0.18	1.0	0.50	0.20	625.00	0.0
	Downstream (BMI-6)	3.60	0.0000	0.36	0.36	0.50	0.047	0.18	1.0	0.50	0.17	625.00	0.0
Zinc	Reference No. 2	44.00	0.0025	19.00	26.00	0.50	0.047	0.18	1.0	0.50	6.13	250.00	0.0
	Outfall 001 (BMI-1)	33.00	0.0025	19.00	23.00	0.50	0.047	0.18	1.0	0.50	5.73	250.00	0.0
	Outfall 002 (BMI-2)	30.00	0.0025	19.00	20.00	0.50	0.047	0.18	1.0	0.50	5.51	250.00	0.0
	Outfall 004 (BMI-4)	29.00	0.0025	20.00	29.00	0.50	0.047	0.18	1.0	0.50	6.13	250.00	0.0
	Downstream (BMI-6)	25.00	0.0000	21.00	22.00	0.50	0.047	0.18	1.0	0.50	5.89	250.00	0.0
PCBs (Total)	Reference No. 2	0.0083	0.00003	0.076	0.022	0.50	0.047	0.18	1.0	0.50	0.02	0.13	0.1
	Outfall 001 (BMI-1)	0.0082	0.00003	0.089	0.016	0.50	0.047	0.18	1.0	0.50	0.02	0.13	0.1
	Outfall 002 (BMI-2)	0.0083	0.00003	0.21	0.019	0.50	0.047	0.18	1.0	0.50	0.04	0.13	0.3
	Outfall 004 (BMI-4)	0.0084	0.00003	0.49	0.590	0.50	0.047	0.18	1.0	0.50	0.13	0.13	1.0
	Downstream (BMI-6)	0.0082	0.00000	2.50	0.019	0.50	0.047	0.18	1.0	0.50	0.50	0.13	3.9

Notes
1) All concentrations in mg/kg, wet weight
2) Tissue concentrations represent a mean value for all fish or clams collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in tissue represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) Model assumes a diet of 80% fish and 20% clams

Table 53 (cont'd.). Hazard Quotient Calculations for Raccoon
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Max. Conc. in Fish (mg/kg)	Max. Conc. in Clams (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing. Rate (kg/day)	Water Ing. Rate (L/day)	AUF	Body Weight (1/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	HQ
Arsenic	Reference No 2	2.10	0.0011	0.076	0.54	0.50	0.047	0.18	1.0	0.50	0.09	0.15	0.6
	Outfall 001 (BMI-1)	3.30	0.0011	0.150	0.65	0.50	0.047	0.18	1.0	0.50	0.14	0.15	0.9
	Outfall 002 (BMI-2)	1.80	0.0011	0.100	0.68	0.50	0.047	0.18	1.0	0.50	0.10	0.15	0.6
	Outfall 004 (BMI-4)	2.80	0.0011	0.094	0.65	0.50	0.047	0.18	1.0	0.50	0.12	0.15	0.8
	Downstream (BMI-6)	0.94	0.0000	0.100	0.79	0.50	0.047	0.18	1.0	0.50	0.08	0.15	0.5
Cadmium	Reference No 2	0.11	0.0015	0.12	0.096	0.50	0.047	0.18	1.0	0.50	0.03	0.75	0.0
	Outfall 001 (BMI-1)	0.18	0.0015	0.14	0.12	0.50	0.047	0.18	1.0	0.50	0.04	0.75	0.1
	Outfall 002 (BMI-2)	0.17	0.0015	0.15	0.09	0.50	0.047	0.18	1.0	0.50	0.04	0.75	0.1
	Outfall 004 (BMI-4)	0.12	0.0015	0.15	0.12	0.50	0.047	0.18	1.0	0.50	0.04	0.75	0.1
	Downstream (BMI-6)	0.16	0.0000	0.16	0.13	0.50	0.047	0.18	1.0	0.50	0.04	0.75	0.1
Chromium	Reference No 2	13.00	0.0025	0.70	0.46	0.50	0.047	0.18	1.0	0.50	0.47	0.17	2.8
	Outfall 001 (BMI-1)	8.30	0.0025	0.57	0.31	0.50	0.047	0.18	1.0	0.50	0.32	0.17	1.9
	Outfall 002 (BMI-2)	7.90	0.0025	0.73	0.40	0.50	0.047	0.18	1.0	0.50	0.35	0.17	2.1
	Outfall 004 (BMI-4)	11.50	0.0025	0.60	0.57	0.50	0.047	0.18	1.0	0.50	0.42	0.17	2.5
	Downstream (BMI-6)	6.90	0.0000	0.47	1.10	0.50	0.047	0.18	1.0	0.50	0.31	0.17	1.8
Copper	Reference No 2	12.30	0.0025	0.81	7.00	0.50	0.047	0.18	1.0	0.50	0.80	1.00	0.8
	Outfall 001 (BMI-1)	5.50	0.0025	4.60	6.30	0.50	0.047	0.18	1.0	0.50	1.36	1.00	1.4
	Outfall 002 (BMI-2)	4.80	0.0025	1.10	8.60	0.50	0.047	0.18	1.0	0.50	0.76	1.00	0.8
	Outfall 004 (BMI-4)	4.50	0.0025	1.40	5.90	0.50	0.047	0.18	1.0	0.50	0.68	1.00	0.7
	Downstream (BMI-6)	3.00	0.0000	1.50	9.10	0.50	0.047	0.18	1.0	0.50	0.83	1.00	0.8
Lead	Reference No 2	12.30	0.0011	0.14	0.15	0.50	0.047	0.18	1.0	0.50	0.32	0.15	2.2
	Outfall 001 (BMI-1)	12.00	0.0011	0.092	0.081	0.50	0.047	0.18	1.0	0.50	0.30	0.15	2.0
	Outfall 002 (BMI-2)	7.30	0.0011	0.100	0.12	0.50	0.047	0.18	1.0	0.50	0.20	0.15	1.3
	Outfall 004 (BMI-4)	4.50	0.0011	0.25	0.08	0.50	0.047	0.18	1.0	0.50	0.16	0.15	1.1
	Downstream (BMI-6)	5.30	0.0000	0.10	0.084	0.50	0.047	0.18	1.0	0.50	0.15	0.15	1.0
Mercury	Reference No 2	0.49	0.0001	0.27	0.16	0.50	0.047	0.18	1.0	0.50	0.07	0.01	7.4
	Outfall 001 (BMI-1)	0.14	0.0001	0.27	0.14	0.50	0.047	0.18	1.0	0.50	0.06	0.01	6.4
	Outfall 002 (BMI-2)	0.12	0.0001	0.26	0.18	0.50	0.047	0.18	1.0	0.50	0.06	0.01	6.4
	Outfall 004 (BMI-4)	0.032	0.0001	0.27	0.09	0.50	0.047	0.18	1.0	0.50	0.06	0.01	5.9
	Downstream (BMI-6)	0.05	0.0000	0.27	0.13	0.50	0.047	0.18	1.0	0.50	0.06	0.01	6.2
Nickel	Reference No 2	8.40	0.0050	0.39	0.32	0.50	0.047	0.18	1.0	0.50	0.29	62.50	0.0
	Outfall 001 (BMI-1)	4.90	0.0050	0.46	0.40	0.50	0.047	0.18	1.0	0.50	0.23	62.50	0.0
	Outfall 002 (BMI-2)	4.50	0.0050	0.51	0.30	0.50	0.047	0.18	1.0	0.50	0.22	62.50	0.0
	Outfall 004 (BMI-4)	4.20	0.0050	0.47	0.40	0.50	0.047	0.18	1.0	0.50	0.21	62.50	0.0
	Downstream (BMI-6)	3.60	0.0000	0.52	0.43	0.50	0.047	0.18	1.0	0.50	0.21	62.50	0.0
Zinc	Reference No 2	44.00	0.0025	22.00	30.00	0.50	0.047	0.18	1.0	0.50	6.93	25.00	0.3
	Outfall 001 (BMI-1)	33.00	0.0025	23.00	25.00	0.50	0.047	0.18	1.0	0.50	6.63	25.00	0.3
	Outfall 002 (BMI-2)	30.00	0.0025	24.00	20.00	0.50	0.047	0.18	1.0	0.50	6.51	25.00	0.3
	Outfall 004 (BMI-4)	29.00	0.0025	24.00	29.00	0.50	0.047	0.18	1.0	0.50	6.93	25.00	0.3
	Downstream (BMI-6)	25.00	0.0000	27.00	23.00	0.50	0.047	0.18	1.0	0.50	7.14	25.00	0.3
PCBs (Tot	Reference No 2	0.0083	0.00003	0.140	0.033	0.50	0.047	0.18	1.0	0.50	0.03	0.10	0.3
	Outfall 001 (BMI-1)	0.0082	0.00003	0.140	0.017	0.50	0.047	0.18	1.0	0.50	0.03	0.10	0.3
	Outfall 002 (BMI-2)	0.0083	0.00003	1.00	0.022	0.50	0.047	0.18	1.0	0.50	0.20	0.10	2.0
	Outfall 004 (BMI-4)	0.0084	0.00003	1.10	0.590	0.50	0.047	0.18	1.0	0.50	0.25	0.10	2.5
	Downstream (BMI-6)	0.0082	0.00000	4.20	0.021	0.50	0.047	0.18	1.0	0.50	0.84	0.10	8.4

Notes
1) All concentrations in mg/kg, wet weight
2) Tissue concentrations represent a maximum value for all fish or clams collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in tissue represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) Model assumes a diet of 80% fish and 20% clams

Table 53 (cont'd.). Hazard Quotient Calculations for Raccoon
Avtex Fibers Site
Front Royal, VA
February 1999

Chemical	Location	Sed. Conc. (mg/kg)	Water Conc. (mg/L)	Max. Conc. in Fish (mg/kg)	Max. Conc. in Clams (mg/kg)	Ingestion Rate (kg/day)	Sed. Ing Rate (kg/day)	Water Ing Rate (L/day)	AUF	Body Weight (1/kg)	Dose (mg/kg/day)	LOAEL (mg/kg/day)	HQ
Arsenic	Reference No. 2	2.10	0.0011	0.076	0.54	0.50	0.047	0.18	1.0	0.50	0.09	1.50	0.1
	Outfall 001 (BMI-1)	3.30	0.0011	0.150	0.65	0.50	0.047	0.18	1.0	0.50	0.14	1.50	0.1
	Outfall 002 (BMI-2)	1.80	0.0011	0.100	0.68	0.50	0.047	0.18	1.0	0.50	0.10	1.50	0.1
	Outfall 004 (BMI-4)	2.80	0.0011	0.094	0.65	0.50	0.047	0.18	1.0	0.50	0.12	1.50	0.1
	Downstream (BMI-6)	0.94	0.0000	0.100	0.79	0.50	0.047	0.18	1.0	0.50	0.08	1.50	0.1
Cadmium	Reference No. 2	0.11	0.0015	0.12	0.096	0.50	0.047	0.18	1.0	0.50	0.03	7.50	0.0
	Outfall 001 (BMI-1)	0.18	0.0015	0.14	0.12	0.50	0.047	0.18	1.0	0.50	0.04	7.50	0.0
	Outfall 002 (BMI-2)	0.17	0.0015	0.15	0.09	0.50	0.047	0.18	1.0	0.50	0.04	7.50	0.0
	Outfall 004 (BMI-4)	0.12	0.0015	0.15	0.12	0.50	0.047	0.18	1.0	0.50	0.04	7.50	0.0
	Downstream (BMI-6)	0.16	0.0000	0.16	0.13	0.50	0.047	0.18	1.0	0.50	0.04	7.50	0.0
Chromium	Reference No. 2	13.00	0.0025	0.70	0.46	0.50	0.047	0.18	1.0	0.50	0.47	1.70	0.3
	Outfall 001 (BMI-1)	8.30	0.0025	0.57	0.31	0.50	0.047	0.18	1.0	0.50	0.32	1.70	0.2
	Outfall 002 (BMI-2)	7.90	0.0025	0.73	0.40	0.50	0.047	0.18	1.0	0.50	0.35	1.70	0.2
	Outfall 004 (BMI-4)	11.50	0.0025	0.60	0.57	0.50	0.047	0.18	1.0	0.50	0.42	1.70	0.2
	Downstream (BMI-6)	6.90	0.0000	0.47	1.10	0.50	0.047	0.18	1.0	0.50	0.31	1.70	0.2
Copper	Reference No. 2	12.30	0.0025	0.81	7.00	0.50	0.047	0.18	1.0	0.50	0.80	10.00	0.1
	Outfall 001 (BMI-1)	5.50	0.0025	4.60	6.30	0.50	0.047	0.18	1.0	0.50	1.36	10.00	0.1
	Outfall 002 (BMI-2)	4.80	0.0025	1.10	8.60	0.50	0.047	0.18	1.0	0.50	0.76	10.00	0.1
	Outfall 004 (BMI-4)	4.50	0.0025	1.40	5.90	0.50	0.047	0.18	1.0	0.50	0.68	10.00	0.1
	Downstream (BMI-6)	3.00	0.0000	1.50	9.10	0.50	0.047	0.18	1.0	0.50	0.83	10.00	0.1
Lead	Reference No. 2	12.30	0.0011	0.14	0.15	0.50	0.047	0.18	1.0	0.50	0.32	1.50	0.2
	Outfall 001 (BMI-1)	12.00	0.0011	0.092	0.081	0.50	0.047	0.18	1.0	0.50	0.30	1.50	0.2
	Outfall 002 (BMI-2)	7.30	0.0011	0.100	0.12	0.50	0.047	0.18	1.0	0.50	0.20	1.50	0.1
	Outfall 004 (BMI-4)	4.50	0.0011	0.25	0.08	0.50	0.047	0.18	1.0	0.50	0.16	1.50	0.1
	Downstream (BMI-6)	5.30	0.0000	0.10	0.084	0.50	0.047	0.18	1.0	0.50	0.15	1.50	0.1
Mercury	Reference No. 2	0.49	0.0001	0.27	0.16	0.50	0.047	0.18	1.0	0.50	0.07	0.1	0.7
	Outfall 001 (BMI-1)	0.14	0.0001	0.27	0.14	0.50	0.047	0.18	1.0	0.50	0.06	0.1	0.6
	Outfall 002 (BMI-2)	0.12	0.0001	0.26	0.18	0.50	0.047	0.18	1.0	0.50	0.06	0.1	0.6
	Outfall 004 (BMI-4)	0.032	0.0001	0.27	0.09	0.50	0.047	0.18	1.0	0.50	0.06	0.1	0.6
	Downstream (BMI-6)	0.05	0.0000	0.27	0.13	0.50	0.047	0.18	1.0	0.50	0.06	0.1	0.6
Nickel	Reference No. 2	8.40	0.0050	0.39	0.32	0.50	0.047	0.18	1.0	0.50	0.29	625.00	0.0
	Outfall 001 (BMI-1)	4.90	0.0050	0.46	0.40	0.50	0.047	0.18	1.0	0.50	0.23	625.00	0.0
	Outfall 002 (BMI-2)	4.50	0.0050	0.51	0.30	0.50	0.047	0.18	1.0	0.50	0.22	625.00	0.0
	Outfall 004 (BMI-4)	4.20	0.0050	0.47	0.40	0.50	0.047	0.18	1.0	0.50	0.21	625.00	0.0
	Downstream (BMI-6)	3.60	0.0000	0.52	0.43	0.50	0.047	0.18	1.0	0.50	0.21	625.00	0.0
Zinc	Reference No. 2	44.00	0.0025	22.00	30.00	0.50	0.047	0.18	1.0	0.50	6.93	250.00	0.0
	Outfall 001 (BMI-1)	33.00	0.0025	23.00	25.00	0.50	0.047	0.18	1.0	0.50	6.63	250.00	0.0
	Outfall 002 (BMI-2)	30.00	0.0025	24.00	20.00	0.50	0.047	0.18	1.0	0.50	6.51	250.00	0.0
	Outfall 004 (BMI-4)	29.00	0.0025	24.00	29.00	0.50	0.047	0.18	1.0	0.50	6.93	250.00	0.0
	Downstream (BMI-6)	25.00	0.0000	27.00	23.00	0.50	0.047	0.18	1.0	0.50	7.14	250.00	0.0
PCBs (Tot	Reference No. 2	0.0083	0.00003	0.140	0.033	0.50	0.047	0.18	1.0	0.50	0.03	0.13	0.2
	Outfall 001 (BMI-1)	0.0082	0.00003	0.140	0.017	0.50	0.047	0.18	1.0	0.50	0.03	0.13	0.2
	Outfall 002 (BMI-2)	0.0083	0.00003	1.00	0.022	0.50	0.047	0.18	1.0	0.50	0.20	0.13	1.5
	Outfall 004 (BMI-4)	0.0084	0.00003	1.10	0.590	0.50	0.047	0.18	1.0	0.50	0.25	0.13	1.9
	Downstream (BMI-6)	0.0082	0.00000	4.20	0.021	0.50	0.047	0.18	1.0	0.50	0.84	0.13	6.5

Notes
1) All concentrations in mg/kg, wet weight
2) Tissue concentrations represent a maximum value for all fish or clams collected from an area
3) A value of 1/2 the MDL was used to calculate the mean metal concentration for those compounds not detected
4) A value of 1/10 the MDL was used to calculate the mean PCB concentration for those compounds not detected
5) The PCB concentration in tissue represents the total Aroclor 1254 and 1260 found in the fish
6) The sediment concentration is based on a single sediment sample
7) Model assumes a diet of 80% fish and 20% clams

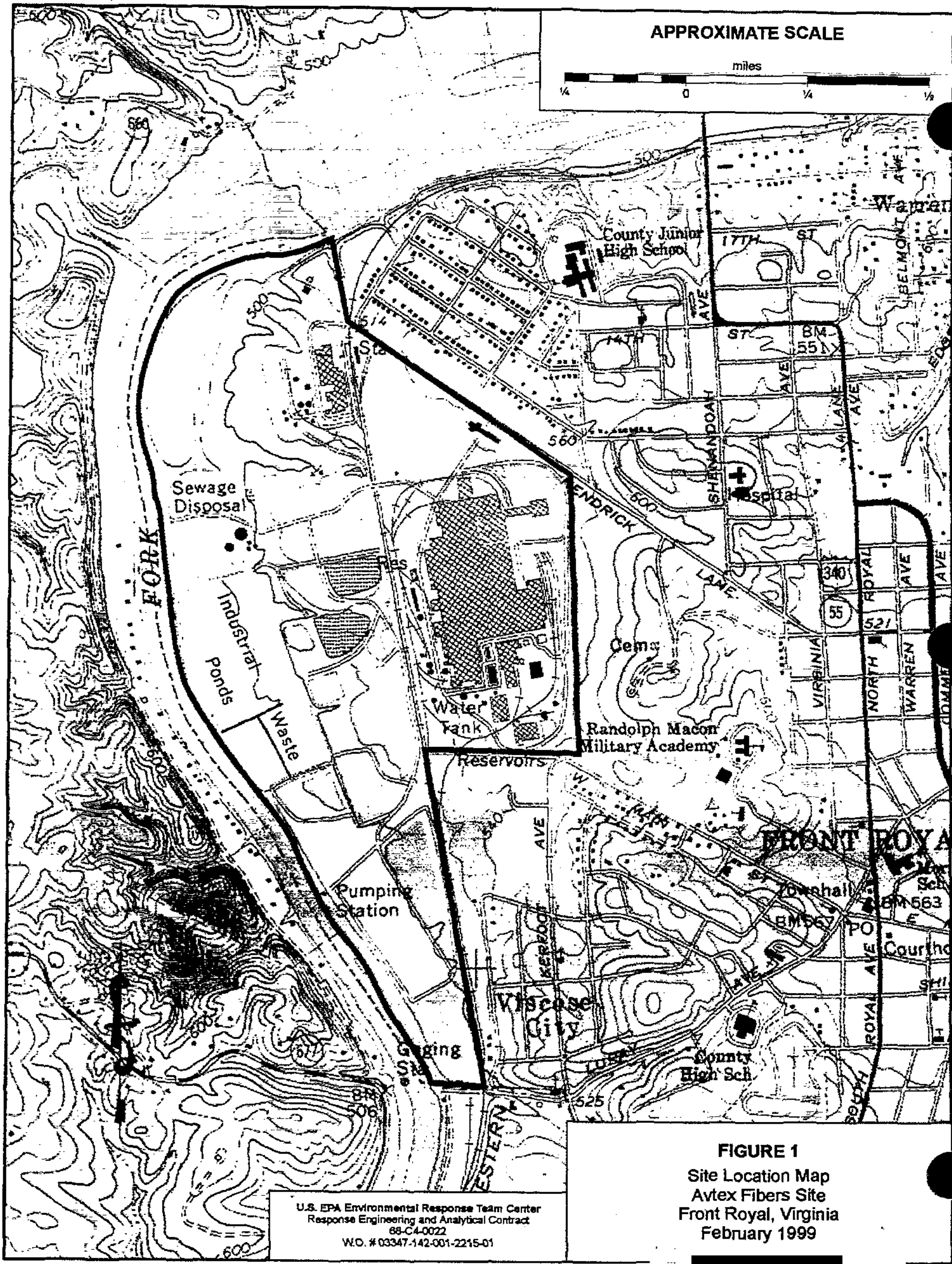

FIGURE 1
Site Location Map
Avtex Fibers Site
Front Royal, Virginia
February 1999

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2215figs.cdr (page 1)

EPA REGION III
SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOC ID 146737
PAGE # [redacted]

IMAGERY COVER SHEET
UNSCANNABLE ITEM

SITE NAME Avtex Fibers Update

OPERABLE UNIT Enforcement Removal

ADMINISTRATIVE RECORDS- SECTION IX VOLUME

REPORT OR DOCUMENT TITLE Final Ecological Risk Assessment Report - Volume 1: Text, Tables, Figures, Appendices A-D

DATE OF DOCUMENT 01-Feb-99

DESCRIPTON OF IMAGERY Figure 2
Site Map

NUMBER AND TYPE OF IMAGERY ITEM(S) 1 oversize map

ORIGINAL MAPS PREPARED BY E.R.M.

U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O.# 03347-142-001-2215-01

FIGURE 2
SITE MAP
AVTEX FIBERS SITE
FRONT ROYAL, VIRGINIA
FEBRUARY 1999

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APPENDIX A
Small Mammal Data Sheets
Avtex Fibers Site
Front Royal, VA
February 1999

1-215-201

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. TP-6-9 Sample No. SM001

Collector ______ Date Collected 5/13/97
Processor Phil Kim Date Processed 5/13/97

Genus/Species Microtus pennsylvanicus Trap Type Museum special Live Dead (circle one)
Total(mm) 143 Tail (mm) 32 Hind Foot (mm) 21 Ear (mm) NA
Weight(g) 49 Partial Whole (circle one)

Ectoparasites: Y N Ticks Saved Discarded (circle one)
Endoparasites: Y N Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L 2 R 3

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		histo section taken
Spleen		
Adrenal	L___ R___	
Kidney	L___ R___	left taken for histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300498

1-215-202

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. Ref-5-19 Sample No. SM 002

Collector ______ Date Collected 5/12/97

Processor Phil Kim Date Processed 5/13/97

Genus/Species Blarina brevicauda Trap Type Museum special Live Dead (circle one)

Total(mm) 117 Tail (mm) 22 Hind Foot (mm) 15 Ear (mm) NA

Weight(g) 23 Partial Whole (circle one)

Ectoparasites: Y N Ticks Saved Discarded (circle one)

Endoparasites: Y N Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______

R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)

Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______

Right Ovary (mm): L______ W______

Placental Scars L______ R______

Embryos (no.) L 4 R 4

Mammaries: Small Large Lactating (circle one)

Vagina: Inactive Cornified Turgid Plugged (circle one)

Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo taken
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo taken
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)

Age Based on Body Size: Juvenile Subadult Adult (circle one)

Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300499

1-215-203

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. Ref-2-11 Sample No. SM003

Collector ______ Date Collected 5/13/97
Processor Phil Kim Date Processed 5/13/97

Genus/Species Microtus pennsylvanicus Trap Type Museum special Live Dead (circle one)
Total(mm) 142 Tail (mm) 32 Hind Foot (mm) 20 Ear (mm) NA
Weight(g) 38g Partial Whole (circle one)

Ectoparasites: Y N Ticks Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		
Spleen		
Adrenal	L______ R______	
Kidney	L______ R______	
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300500

~~1-215-200~~
1-215-204

SMALL MAMMAL SAMPLING AND PROCESSING

WA

Small Mammal Data Sheet

Site Name Avtex Location No. Marsh area, line along wood edge Sample No. SM004

Collector________ Date Collected 5/13/97
Processor Phil Kim Date Processed 5/13/97

Genus/Species Peromyscus ? Trap Type Museum special Live Dead (circle one)
Total(mm) — Tail (mm) — Hind Foot (mm) — Ear (mm) —
Weight(g) 8 Partial Whole (circle one)

Ectoparasites: Y N ________ Saved Discarded (circle one)
Endoparasites: Y N ________ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		No histo taken
Spleen		
Adrenal	L___ R___	
Kidney	L___ R___	No histo taken
Thymus		

Dorsal Pelage Color ________ Ventral Pelage Color ________ Side Pelage Color ________

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

Animal is partial. Possibly a peromyscus (brown above, white below).

[redacted]

AR300501

1-215-205

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Adtex Location No. TP-3-19 Sample No. SM-0045 PK

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/13/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 154 Tail (mm) 38 Hind Foot (mm) 20 Ear (mm) NA
Weight(g) 51.63 Partial Whole (circle one)

Ectoparasites: Y N Ticks Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo taken
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo taken
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300502

1-215-206

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex   Location No. FA-10-8   Sample No. SM 006

Collector ______   Date Collected ______

Processor Phil Kim (MA)   Date Processed 5/14/97

Genus/Species Microtus ~~ochrogaster~~ pennsylvanicus (PA) Trap Type Museum special   Live Dead (circle one)

Total(mm) 130   Tail (mm) 20   Hind Foot (mm) 16   Ear (mm) —

Weight(g) 26   Partial Whole (circle one)

Ectoparasites: Y N lice   Saved Discarded (circle one)

Endoparasites: Y N ______   Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______

R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)

Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______

Right Ovary (mm): L______ W______

Placental Scars L______ R______

Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)

Vagina: Inactive Cornified Turgid Plugged (circle one)

Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver	______	Histo
Spleen	______	
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus	______	

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)

Age Based on Body Size: Juvenile Subadult Adult (circle one)

Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300503

1-215-207

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. FA -10 -10 Sample No. SM 007

Collector ______ Date Collected ______

Processor Phil Kim Date Processed 5/14/97

Genus/Species Microtus pennsylvanicus Trap Type Museum special Live Dead (circle one)

Total(mm) 105 Tail (mm) 18 Hind Foot (mm) 18 Ear (mm) ______

Weight(g) 20.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)

Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______

R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)

Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______

Right Ovary (mm): L______ W______

Placental Scars L______ R______

Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)

Vagina: Inactive Cornified Turgid Plugged (circle one)

Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)

Age Based on Body Size: Juvenile Subadult Adult (circle one)

Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

1-215-208

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex   Location No. WA - A - 50   Sample No. SM 008

Collector ____   Date Collected ____
Processor Phil Kim   Date Processed 5/14/97

Genus/Species Blarina brevicauda   Trap Type Museum Special   Live Dead (circle one)
Total(mm) 110   Tail (mm) 20   Hind Foot (mm) 13   Ear (mm) —
Weight(g) 16.5   Partial Whole (circle one)

Ectoparasites: Y N ____   Saved Discarded (circle one)
Endoparasites: Y N ____   Saved Discarded (circle one)

Male

Testicle Wt (g): L____ R____

L Testicle (mm): L____ W____
R Testicle (mm): L____ W____

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L____ R____

Left Ovary (mm): L____ W____
Right Ovary (mm): L____ W____

Placental Scars L____ R____
Embryos (no.) L____ R____

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ____ w/o Ovaries (g) ____

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ____ Ventral Pelage Color ____ Side Pelage Color ____

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

1-315-209

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. REF - 6 - 1 Sample No. SM 009

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/14/97

Genus/Species Blarina brevicauda Trap Type Museum special Live Dead (circle one)
Total(mm) 116 Tail (mm) 24 Hind Foot (mm) 14 Ear (mm) —
Weight(g) 22.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300506

1-215-210

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. KEF-6-7 Sample No. SM010

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/14/97

Genus/Species Blarina brevicauda Trap Type Museum special Live Dead (circle one)
Total(mm) 124 Tail (mm) 23 Hind Foot (mm) 13 Ear (mm) —
Weight(g) 23 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		HISTO
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300507

1-215-211

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. REF-5-18 Sample No. SM011

Collector
Date Collected
Processor Phil Kim
Date Processed 5/14/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 102 Tail (mm) 25 Hind Foot (mm) 19 Ear (mm) —
Weight(g) 18 Partial Whole (circle one)

Ectoparasites: Y N Lice Saved Discarded (circle one)
Endoparasites: Y N Saved Discarded (circle one)

Male

Testicle Wt (g): L____ R____

L Testicle (mm): L____ W____
R Testicle (mm): L____ W____

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L____ R____

Left Ovary (mm): L____ W____
Right Ovary (mm): L____ W____

Placental Scars L____ R____
Embryos (no.) L____ R____

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ____ w/o Ovaries (g) ____

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L___ R___	
Kidney	L___ R___	Histo
Thymus		

Dorsal Pelage Color ____ Ventral Pelage Color ____ Side Pelage Color ____

Age Based on Sex Organs: ~~Juvenile~~ PO Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300508

1-215-212

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. REF - 2-10 Sample No. SM012

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/14/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 105 Tail (mm) 25 Hind Foot (mm) 16 Ear (mm) —
Weight(g) 14.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300509

1-215-213

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. REF-5-10 Sample No. SM013

Collector ____ Date Collected ____
Processor Phil Kim Date Processed 5/14/97

Genus/Species Blarina brevicauda Trap Type Museum Special Live Dead (circle one)
Total(mm) — Tail (mm) 22 Hind Foot (mm) 12 Ear (mm) —
Weight(g) 17.5 Partial Whole (circle one)

Ectoparasites: Y N ____ Saved Discarded (circle one)
Endoparasites: Y N ____ Saved Discarded (circle one)

Male

Testicle Wt (g): L____ R____
L Testicle (mm): L____ W____
R Testicle (mm): L____ W____
Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L____ R____
Left Ovary (mm): L____ W____
Right Ovary (mm): L____ W____
Placental Scars L____ R____
Embryos (no.) L____ R____
Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)
Uterus w/ Ovaries (g) ____ w/o Ovaries (g) ____

ORGAN	WEIGHT (g)	COMMENTS
Liver		Not taken
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Not taken
Thymus		

missing from partial carcass

NO HISTO

Dorsal Pelage Color ____ Ventral Pelage Color ____ Side Pelage Color ____

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300510

1-215-214.

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. REF-1-17 Sample No. SM014

Collector ______ Date Collected 14
Processor Phil Kim Date Processed 5/17/97 (8)

Genus/Species Blarina brevicauda Trap Type Museum Special Live Dead (circle one)
Total(mm) 115 Tail (mm) 21 Hind Foot (mm) 15 Ear (mm) —
Weight(g) 19.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L______ R______	
Kidney	L______ R______	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult ~~Adult~~ (circle one)

Comments:

[redacted]

AR300511

1-215-215

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Artex Location No. REF-4-17 Sample No. SM015

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/14/97

Genus/Species Blarina brevicauda Trap Type Museum Special Live Dead (circle one)
Total(mm) 115 Tail (mm) 23 Hind Foot (mm) 15 Ear (mm) —
Weight(g) 19.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L 3 R 3

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L___ R___	
Kidney	L___ R___	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300512

1-215-216

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. REF-5-7 Sample No. SM016

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/14/97

Genus/Species Blarina brevicauda Trap Type Museum Special Live Dead (circle one)
Total(mm) 111 Tail (mm) 19 Hind Foot (mm) ~~20~~ ~~19~~ 17 Ear (mm) —
Weight(g) 22 Partial Whole (circle one)

Ectoparasites: Y N Lice Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L____ R____

L Testicle (mm): L____ W____
R Testicle (mm): L____ W____

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L____ R____

Left Ovary (mm): L____ W____
Right Ovary (mm): L____ W____

Placental Scars L____ R____
Embryos (no.) L____ R____

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ____ w/o Ovaries (g) ____

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L___ R___	
Kidney	L___ R___	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

1-215-217

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. FA-10-8 Sample No. SM017

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/14/97

Genus/Species Microtus ~~ochrogaster~~ pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 115 Tail (mm) 20 Hind Foot (mm) 16 Ear (mm) ______
Weight(g) 27.5 Partial Whole (circle one)

Ectoparasites: Y N Lice Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300514

1-215-218

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. FA-10-9 Sample No. SM018

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/14/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 105 Tail (mm) 20 Hind Foot (mm) 15 Ear (mm) —
Weight(g) 27.5 Partial Whole (circle one)

Ectoparasites: Y N Lice Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300515

1-215-219

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Artex Location No. FA-10-8 Sample No. SM 019

Collector ______ Date Collected 15

Processor Phil Kim Date Processed 5/14/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)

Total(mm) 110 Tail (mm) 17 Hind Foot (mm) 15 Ear (mm) —

Weight(g) 22.5 Partial Whole (circle one)

Ectoparasites: Y N Lice Saved Discarded (circle one)

Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______

R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)

Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______

Right Ovary (mm): L______ W______

Placental Scars L______ R______

Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)

Vagina: Inactive Cornified Turgid Plugged (circle one)

Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L___ R___	
Kidney	L___ R___	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)

Age Based on Body Size: Juvenile Subadult Adult (circle one)

Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

1-215-220

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. REF-1-8 Sample No. SM020

Collector ______ Date Collected 15

Processor Phil Kim Date Processed 5/1?/97

Genus/Species Blarina brevicauda Trap Type Museum Special Live Dead (circle one)

Total(mm) 114 Tail (mm) 21 Hind Foot (mm) 14 Ear (mm) —

Weight(g) 20.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)

Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______

R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)

Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______

Right Ovary (mm): L______ W______

Placental Scars L______ R______

Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)

Vagina: Inactive Cornified Turgid Plugged (circle one)

Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)

Age Based on Body Size: Juvenile Subadult Adult (circle one)

Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300517

1-215-221

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex   Location No. REF-1-17   Sample No. SM021

Collector ______   Date Collected 15
Processor Phil Kim   Date Processed 5/14/97

Genus/Species Microtus pennsylvanicus   Trap Type Museum Special   Live Dead (circle one)
Total(mm) 103   Tail (mm) 22   Hind Foot (mm) 17   Ear (mm) —
Weight(g) 14   Partial Whole (circle one)

Ectoparasites: Y N ______   Saved Discarded (circle one)
Endoparasites: Y N ______   Saved Discarded (circle one)

Male

Testicle Wt (g): L____ R____
L Testicle (mm): L____ W____
R Testicle (mm): L____ W____
Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L____ R____
Left Ovary (mm): L____ W____
Right Ovary (mm): L____ W____
Placental Scars L____ R____
Embryos (no.) L____ R____

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ____ w/o Ovaries (g) ____

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300518

1-215-222

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. FA-11-21 Sample No. SM022

Collector ______ Date Collected 15
Processor Phil Kim Date Processed 5/14/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 126 Tail (mm) 31 Hind Foot (mm) 20 Ear (mm) —
Weight(g) 24.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L____ R____

L Testicle (mm): L____ W____
R Testicle (mm): L____ W____

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L____ R____

Left Ovary (mm): L____ W____
Right Ovary (mm): L____ W____

Placental Scars L____ R____
Embryos (no.) L____ R____

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ____ w/o Ovaries (g) ____

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L___ R___	
Kidney	L___ R___	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300519

1-215-223

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Autex Location No. FA-10-9 Sample No. SM023

Collector ______ Date Collected PK
Processor Phil Kim Date Processed 5/14/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special 15 Live Dead (circle one)
Total(mm) 118 Tail (mm) 17 Hind Foot (mm) 15 Ear (mm) —
Weight(g) 26.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L______ R______	
Kidney	L______ R______	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300520

1-215-224

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. REF - 5 - 20 Sample No. SM024

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/15/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 107 Tail (mm) 28 Hind Foot (mm) 19 Ear (mm) ——
Weight(g) 16.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300521

1-215-225

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Arlex Location No. REF-5-19 Sample No. SM 025

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/15/97

Genus/Species Blarina brevicauda Trap Type Museum Special Live Dead (circle one)
Total(mm) 116 Tail (mm) 28 Hind Foot (mm) 15 Ear (mm) ______
Weight(g) 11.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

1-215-226

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. REF-2-12 Sample No. SM026

Collector ______ Date Collected ______

Processor Phil Kim Date Processed 5/15/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)

Total(mm) 107 Tail (mm) 29 Hind Foot (mm) 18 Ear (mm) ______

Weight(g) 13 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)

Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______

R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)

Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______

Right Ovary (mm): L______ W______

Placental Scars L______ R______

Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)

Vagina: Inactive Cornified Turgid Plugged (circle one)

Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)

Age Based on Body Size: Juvenile Subadult Adult (circle one)

Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300523

1-215-227

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex   Location No. FA-10-10   Sample No. SM027

Collector ______   Date Collected ______
Processor Phil Kim   Date Processed 5/15/97

Genus/Species Microtus pennsylvanicus   Trap Type Museum Special   Live Dead (circle one)
Total(mm) 121   Tail (mm) 20   Hind Foot (mm) 16   Ear (mm) ______
Weight(g) 30.5   Partial Whole (circle one)

Ectoparasites: Y N ______   Saved Discarded (circle one)
Endoparasites: Y N ______   Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

1-215-228

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. FA-11-2 Sample No. SM028

Collector ______ Date Collected ______

Processor Phil Kim Date Processed 5/15/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)

Total(mm) 95 Tail (mm) 20 Hind Foot (mm) 15 Ear (mm) —

Weight(g) 19.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)

Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______

R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)

Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______

Right Ovary (mm): L______ W______

Placental Scars L______ R______

Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)

Vagina: Inactive Cornified Turgid Plugged (circle one)

Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)

Age Based on Body Size: Juvenile Subadult Adult (circle one)

Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300525

1-215-229

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Artex Location No. REF-6-10 Sample No. SM029

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/15/97

Genus/Species Blarina brevicauda Trap Type Museum Special Live Dead (circle one)
Total(mm) 114 Tail (mm) 19 Hind Foot (mm) 15 Ear (mm) —
Weight(g) 22.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300526

1-215-230

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Artex   Location No. FA-10-18   Sample No. SM030

Collector ____________   Date Collected ____________

Processor Phil Kim   Date Processed 5/15/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special   Live Dead (circle one)

Total(mm) 111   Tail (mm) 28   Hind Foot (mm) 15   Ear (mm) ______

Weight(g) 17.5   Partial Whole (circle one)

Ectoparasites: Y N ____________   Saved Discarded (circle one)

Endoparasites: Y N ____________   Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______

R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)

Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______

Right Ovary (mm): L______ W______

Placental Scars L______ R______

Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)

Vagina: Inactive Cornified Turgid Plugged (circle one)

Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)

Age Based on Body Size: Juvenile Subadult Adult (circle one)

Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

1-215-231

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. TP-1-2 Sample No. SM031

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/15/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 136 Tail (mm) 32 Hind Foot (mm) 22 Ear (mm) ______
Weight(g) 36 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______
L Testicle (mm): L______ W______
R Testicle (mm): L______ W______
Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______
Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______
Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300528

1-215-232

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Artex Location No. TP-1-1 Sample No. SM032

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/15/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 160 Tail (mm) 36 Hind Foot (mm) 20 Ear (mm) ——
Weight(g) 49 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L____ R____

L Testicle (mm): L____ W____
R Testicle (mm): L____ W____

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L____ R____

Left Ovary (mm): L____ W____
Right Ovary (mm): L____ W____

Placental Scars L____ R____
Embryos (no.) L____ R____

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ____ w/o Ovaries (g) ____

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

1-215-233

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. TP-2-2 Sample No. SM033

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/15/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 135 Tail (mm) 32 Hind Foot (mm) 20 Ear (mm) ____
Weight(g) 28.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L____ R____

L Testicle (mm): L____ W____
R Testicle (mm): L____ W____

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L____ R____

Left Ovary (mm): L____ W____
Right Ovary (mm): L____ W____

Placental Scars L____ R____
Embryos (no.) L____ R____

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ____ w/o Ovaries (g) ____

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L___ R___	
Kidney	L___ R___	Histo
Thymus		

Dorsal Pelage Color ____ Ventral Pelage Color ____ Side Pelage Color ____

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

1-215-233
-234

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. REF-6-1 9 Sample No. SM034

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/15/97

Genus/Species Microtus pennsylvanicus Trap Type Museum Special Live Dead (circle one)
Total(mm) 161 Tail (mm) 40 Hind Foot (mm) 18 Ear (mm) ______
Weight(g) 64g Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L 3 R 3

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments: 113
49
64

[redacted]

1-215-235

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. WA - NORTH - 20 Sample No. SM035

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/15/97

Genus/Species Peromyscus leucopus Trap Type Museum Special Live Dead (circle one)
Total(mm) 165 Tail (mm) 71 Hind Foot (mm) 19 Ear (mm) —
Weight(g) 25.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: PC Juvenile ~~Subadult~~ Adult (circle one)

Comments:

[redacted]

AR300532

1-215-236

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. WA-SOUTH-17 Sample No. SM036

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/15/97

Genus/Species Peromyscus leucopus Trap Type Museum Special Live Dead (circle one)
Total(mm) 175 Tail (mm) 084 Hind Foot (mm) 19 Ear (mm) ______
Weight(g) 23.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male

Testicle Wt (g): L______ R______

L Testicle (mm): L______ W______
R Testicle (mm): L______ W______

Seminal Vesicle: Small Large (circle one)
Epididymis: Conv. Not Conv. (circle one)

Female

Ovary Weight (g): L______ R______

Left Ovary (mm): L______ W______
Right Ovary (mm): L______ W______

Placental Scars L______ R______
Embryos (no.) L______ R______

Mammaries: Small Large Lactating (circle one)
Vagina: Inactive Cornified Turgid Plugged (circle one)
Repr. Stage: Nulli Semi Multi (circle one)

Uterus w/ Ovaries (g) ______ w/o Ovaries (g) ______

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L___ R___	
Kidney	L___ R___	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile ~~Subadult~~ Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300533

1-215-237

SMALL MAMMAL SAMPLING AND PROCESSING

Small Mammal Data Sheet

Site Name Avtex Location No. TP - 4A - 8 Sample No. SM037

Collector ______ Date Collected ______
Processor Phil Kim Date Processed 5/17/97

Genus/Species Peromyscus leucopus Trap Type Museum Special Live Dead (circle one)
Total(mm) 155 Tail (mm) 70 Hind Foot (mm) 21 Ear (mm) —
Weight(g) 22.5 Partial Whole (circle one)

Ectoparasites: Y N ______ Saved Discarded (circle one)
Endoparasites: Y N ______ Saved Discarded (circle one)

Male	**Female**
Testicle Wt (g): L____ R____	Ovary Weight (g): L____ R____
L Testicle (mm): L____ W____	Left Ovary (mm): L____ W____
R Testicle (mm): L____ W____	Right Ovary (mm): L____ W____
Seminal Vesicle: Small Large (circle one)	Placental Scars L____ R____
Epididymis: Conv. Not Conv. (circle one)	Embryos (no.) L____ R____
	Mammaries: Small Large Lactating (circle one)
	Vagina: Inactive Cornified Turgid Plugged (circle one)
	Repr. Stage: Nulli Semi Multi (circle one)
	Uterus w/ Ovaries (g) ____ w/o Ovaries (g) ____

ORGAN	WEIGHT (g)	COMMENTS
Liver		Histo
Spleen		
Adrenal	L____ R____	
Kidney	L____ R____	Histo
Thymus		

Dorsal Pelage Color ______ Ventral Pelage Color ______ Side Pelage Color ______

Age Based on Sex Organs: Juvenile Subadult Adult (circle one)
Age Based on Body Size: Juvenile Subadult Adult (circle one)
Age Based on Pelage: Juvenile Subadult Adult (circle one)

Comments:

[redacted]

AR300534

APPENDIX B
Field Notes/Stream Habitat Survey
Avtex Fibers Site
Front Royal, VA
February 1999

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PHYSICAL CHARACTERIZATION/WATER QUALITY
FIELD DATA SHEET

Avtex BMI 3
XRF 4

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land Use:

Forest   Field/Pasture   Agricultural   Residential   Commercial   Industrial   Other ____________

Local Watershed Erosion: None   Moderate   Heavy

Local Watershed NPS Pollution: No evidence   Some Potential Sources   Obvious Sources

Estimated Stream Width 50 m   Estimated Stream Depth: Riffle ____ m   Run / m   Pool ____ m

High Water Mark 5 m   Velocity ____   Dam Present: Yes ___ No /   Channelized: Yes ___ No ___

Canopy Cover: Open   Partly Open   Partly Shaded   Shaded

SEDIMENT/SUBSTRATE:

Sediment Odors: Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other ____________

Sediment Oils: Absent   Slight   Moderate   Profuse

Sediment Deposits: Sludge   Sawdust   Paper Fiber   Sand   Relict Shells   Other Sand/silt

Are the undersides of stones which are not deeply embedded black?   Yes   No

Inorganic Substrate Components

Substrate Type	Diameter	Percent Composition in Sampling Area
Bedrock		—
Boulder	>256-mm (10 in.)	1%
Cobble	64-256-mm (2.5-10 in.)	
Gravel	2-64-mm (0.1-2.5 in.)	30
Sand	0.06-2.00-mm (gritty)	50
Silt	.004-.06-mm	10
Clay	<.004-mm (slick)	—

Organic Substrate Components

Substrate Type	Characteristic	Percent Composition in Sampling Area
Detritus	Sticks, Wood, Coarse Plant Materials (CPOM)	
Muck-Mud	Black, Very Fine Organic (FPOM)	
Marl	Grey, Shell Fragments	

5/14 **WATER QUALITY**

Temperature 14.8 C   Dissolved Oxygen 10.86   pH 8.85   Conductivity 0.237   Other ____________

Instrument(s) Used ____________

Stream Type: Coldwater   Warmwater

Water Odors: Normal   Sewage   Petroleum   Chemical   None   Other ____________

Water Surface Oils: Slick   Sheen   Globs   Flecks   None

Turbidity: Clear   Slightly Turbid   Turbid   Opaque   Water Color ____________

WEATHER CONDITIONS Rainy

PHOTOGRAPH NUMBER

OBSERVATIONS AND/OR SKETCH

Figure 5.1-1. Physical Characterization/Water Quality Field Data Sheet for use with all Rapid Bioassessment Protocols.

5/12/97 4:32P

FIELD DATA SHEET

Aztec BMI 4

XRF 2

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land Use:

Forest   Field/Pasture   Agricultural   Residential   Commercial   Industrial   Other WWTP

Local Watershed Erosion: None   Moderate   Heavy

Local Watershed NPS Pollution: No evidence   Some Potential Sources   Obvious Sources

Estimated Stream Width 50 m   Estimated Stream Depth: Riffle ____ m   Run ✓ m   Pool ____ m

High Water Mark 5 m   Velocity ____   Dam Present: Yes ___ No ✓   Channelized: Yes ___ No ___

Canopy Cover: Open   Partly Open   Partly Shaded   Shaded

SEDIMENT/SUBSTRATE:

Sediment Odors: Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other ____

Sediment Oils: Absent   Slight   Moderate   Profuse

Sediment Deposits: Sludge   Sawdust   Paper Fiber   Sand   Relict Shells   Other Mud/Silt

Are the undersides of stones which are not deeply embedded black? Yes   No

Inorganic Substrate Components		
Substrate Type	Diameter	Percent Composition in Sampling Area
Bedrock		
Boulder	>256-mm (10 in.)	
Cobble	64-256-mm (2.5-10 in.)	20
Gravel	2-64-mm (0.1-2.5 in.)	60
Sand	0.06-2.00-mm (gritty)	10
Silt	.004-.06-mm	5
Clay	<.004-mm (slick)	5

Organic Substrate Components		
Substrate Type	Characteristic	Percent Composition in Sampling Area
Detritus	Sticks, Wood, Coarse Plant Materials (CPOM)	
Muck-Mud	Black, Very Fine Organic (FPOM)	
Marl	Grey, Shell Fragments	

WATER QUALITY

Temperature ____ C   Dissolved Oxygen ____   pH ____   Conductivity ____   Other ____

Instrument(s) Used ____

Stream Type: Coldwater   Warmwater

Water Odors: Normal   Sewage   Petroleum   Chemical   None   Other ____

Water Surface Oils: Slick   Sheen   Globs   Flecks   None

Turbidity: Clear   Slightly Turbid   Turbid   Opaque   Water Color ____

WEATHER CONDITIONS

PHOTOGRAPH NUMBER

OBSERVATIONS AND/OR SKETCH

Figure 5.1-1. Physical Characterization/Water Quality Field Data Sheet for use with all Rapid Bioassessment Protocols.

PHYSICAL CHARACTERIZATION/WATER QUALITY
FIELD DATA SHEET

Autex BMI 5

5/12/97 XRF I

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land Use:

Forest Field/Pasture Agricultural Residential Commercial Industrial Other ________

Local Watershed Erosion: None Moderate Heavy

Local Watershed NPS Pollution: No evidence Some Potential Sources Obvious Sources

Estimated Stream Width 50 m Estimated Stream Depth: Riffle ____ m Run / m Pool ____ m

High Water Mark 5 m Velocity ____ Dam Present: Yes ___ No / Channelized: Yes ___ No ___

Canopy Cover: Open Partly Open Partly Shaded Shaded

SEDIMENT/SUBSTRATE:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other ________

Sediment Oils: Absent Slight Moderate Profuse

Sediment Deposits: Sludge Sawdust Paper Fiber Sand Relict Shells Other Sand silt

Are the undersides of stones which are not deeply embedded black? Yes No

Inorganic Substrate Components			Organic Substrate Components		
Substrate Type	**Diameter**	**Percent Composition in Sampling Area**	**Substrate Type**	**Characteristic**	**Percent Composition in Sampling Area**
Bedrock			Detritus	Sticks, Wood,	
Boulder	>256-mm (10 in.)	—		Coarse Plant	
Cobble	64-256-mm (2.5-10 in.)	1		Materials (CPOM)	
Gravel	2-64-mm (0.1-2.5 in.)	65	Muck-Mud	Black, Very Fine	
Sand	0.06-2.00-mm (gritty)	15		Organic (FPOM)	
Silt	.004-.06-mm	10	Marl	Grey, Shell	
Clay	<.004-mm (slick)	9		Fragments	

WATER QUALITY

Temperature ____ C Dissolved Oxygen ____ pH ____ Conductivity ____ Other ________

Instrument(s) Used ________

Stream Type: Coldwater Warmwater

Water Odors: Normal Sewage Petroleum Chemical None Other ________

Water Surface Oils: Slick Sheen Globs Flecks None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color ________

WEATHER CONDITIONS

PHOTOGRAPH NUMBER

OBSERVATIONS AND/OR SKETCH

Figure 5.1-1. Physical Characterization/Water Quality Field Data Sheet for use with all Rapid Bioassessment Protocols.

PHYSICAL CHARACTERIZATION/WATER QUALITY
FIELD DATA SHEET

RMI 6

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land Use:

Forest   Field/Pasture   Agricultural   Residential   Commercial   Industrial   Other ______

Local Watershed Erosion: None   Moderate   Heavy

Local Watershed NPS Pollution: No evidence   Some Potential Sources   Obvious Sources

Estimated Stream Width 50 m   Estimated Stream Depth: Riffle ___ m   Run ___ m   Pool ___ m

High Water Mark 5 m   Velocity ___   Dam Present: Yes ___ No ✓   Channelized: Yes ___ No ___

Canopy Cover: Open   Partly Open   Partly Shaded   Shaded

SEDIMENT/SUBSTRATE:

Sediment Odors: Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other ______

Sediment Oils: Absent   Slight   Moderate   Profuse

Sediment Deposits: Sludge   Sawdust   Paper Fiber   Sand   Relict Shells   Other Sand - silt

Are the undersides of stones which are not deeply embedded black? Yes   No

Inorganic Substrate Components

Substrate Type	Diameter	Percent Composition in Sampling Area
Bedrock		—
Boulder	>256-mm (10 in.)	10
Cobble	64-256-mm (2.5-10 in.)	50
Gravel	2-64-mm (0.1-2.5 in.)	20
Sand	0.06-2.00-mm (gritty)	10
Silt	.004-.06-mm	10
Clay	<.004-mm (slick)	

Organic Substrate Components

Substrate Type	Characteristic	Percent Composition in Sampling Area
Detritus	Sticks, Wood, Coarse Plant Materials (CPOM)	
Muck-Mud	Black, Very Fine Organic (FPOM)	
Marl	Grey, Shell Fragments	

WATER QUALITY

Temperature ___ C   Dissolved Oxygen ___   pH ___   Conductivity ___   Other ______

Instrument(s) Used ______

Stream Type: Coldwater   Warmwater

Water Odors: Normal   Sewage   Petroleum   Chemical   None   Other ______

Water Surface Oils: Slick   Sheen   Globs   Flecks   None

Turbidity: Clear   Slightly Turbid   Turbid   Opaque   Water Color ______

WEATHER CONDITIONS

PHOTOGRAPH NUMBER

OBSERVATIONS AND/OR SKETCH

Figure 5.1-1. Physical Characterization/Water Quality Field Data Sheet for use with all Rapid Bioassessment Protocols.

PHYSICAL CHARACTERIZATION/WATER QUALITY
FIELD DATA SHEET

Artex
BMI Ref.

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land Use:

Forest   Field/Pasture   Agricultural   Residential   Commercial   Industrial   Other ______

Local Watershed Erosion: None   Moderate   Heavy

Local Watershed NPS Pollution: No evidence   Some Potential Sources   Obvious Sources

Estimated Stream Width ____ m   Estimated Stream Depth: Riffle ____ m   Run ____ m   Pool ____ m

High Water Mark ____ m   Velocity ____   Dam Present: Yes ___ No ___   Channelized: Yes ___ No ___

Canopy Cover: Open   Partly Open   Partly Shaded   Shaded

SEDIMENT/SUBSTRATE:

Sediment Odors: Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other ______

Sediment Oils: Absent   Slight   Moderate   Profuse

Sediment Deposits: Sludge   Sawdust   Paper Fiber   Sand   Relict Shells   Other ______

Are the undersides of stones which are not deeply embedded black?   Yes   No

Inorganic Substrate Components

Substrate Type	Diameter	Percent Composition in Sampling Area
Bedrock		
Boulder	>256-mm (10 in.)	
Cobble	64-256-mm (2.5-10 in.)	
Gravel	2-64-mm (0.1-2.5 in.)	
Sand	0.06-2.00-mm (gritty)	
Silt	.004-.06-mm	
Clay	<.004-mm (slick)	

Organic Substrate Components

Substrate Type	Characteristic	Percent Composition in Sampling Area
Detritus	Sticks, Wood, Coarse Plant Materials (CPOM)	
Muck-Mud	Black, Very Fine Organic (FPOM)	
Marl	Grey, Shell Fragments	

WATER QUALITY

Temperature 15.3 C   Dissolved Oxygen 11.6   pH 8.23   Conductivity 0.234   Other ______

Instrument(s) Used ______

Stream Type: Coldwater   Warmwater

Water Odors: Normal   Sewage   Petroleum   Chemical   None   Other ______

Water Surface Oils: Slick   Sheen   Globs   Flecks   None

Turbidity: Clear 2   Slightly Turbid   Turbid   Opaque   Water Color ______

WEATHER CONDITIONS Rainy

PHOTOGRAPH NUMBER

OBSERVATIONS AND/OR SKETCH

Figure 5.1-1. Physical Characterization/Water Quality Field Data Sheet for use with all Rapid Bioassessment Protocols.

11/4/74 5:28 P Hutex Spring NKF 11 001 outfall

PHYSICAL CHARACTERIZATION/WATER QUALITY
FIELD DATA SHEET

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land Use: pike side

Forest   Field/Pasture   Agricultural   Residential   Commercial   Industrial   Other ______

Local Watershed Erosion: None   Moderate   Heavy

Local Watershed NPS Pollution: No evidence   Some Potential Sources   Obvious Sources

Estimated Stream Width 50 m   Estimated Stream Depth: Riffle ____ m   Run ✓ m   Pool ____ m

High Water Mark 5 m   Velocity ____   Dam Present: Yes __ No ✓   Channelized: Yes __ No __

Canopy Cover: Open   Partly Open   Partly Shaded   Shaded

SEDIMENT/SUBSTRATE:

Sediment Odors: Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other ______

Sediment Oils: Absent   Slight   Moderate   Profuse

Sediment Deposits: Sludge   Sawdust   Paper Fiber   Sand   Relict Shells   Other mud

Are the undersides of stones which are not deeply embedded black?   Yes   No

Inorganic Substrate Components: Substrate Type	Diameter	Percent Composition in Sampling Area	Organic Substrate Components: Substrate Type	Characteristic	Percent Composition in Sampling Area
Bedrock			Detritus	Sticks, Wood,	
Boulder	>256-mm (10 in.)			Coarse Plant	
Cobble	64-256-mm (2.5-10 in.)	20		Materials (CPOM)	
Gravel	2-64-mm (0.1-2.5 in.)	60	Muck-Mud	Black, Very Fine	
Sand	0.06-2.00-mm (gritty)	15		Organic (FPOM)	
Silt	.004-.06-mm	5	Marl	Grey, Shell	
Clay	<.004-mm (slick)	—		Fragments	

5/14

WATER QUALITY

Temperature 15.0 C   Dissolved Oxygen 10.8   pH 8.53   Conductivity 0.243   Other ______

Instrument(s) Used ______

Stream Type: Coldwater   Warmwater

Water Odors: Normal   Sewage   Petroleum   Chemical   None   Other ______

Water Surface Oils: Slick   Sheen   Globs   Flecks   None

Turbidity: Clear   Slightly Turbid   Turbid   Opaque   Water Color ______
1

WEATHER CONDITIONS Rainy

PHOTOGRAPH NUMBER

OBSERVATIONS AND/OR SKETCH

Figure 5.1-1. Physical Characterization/Water Quality Field Data Sheet for use with all Rapid Bioassessment Protocols.

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET

Avtex BMI 2

YRF 7

PHYSICAL CHARACTERIZATION

5/13

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land Use:

Forest   Field/Pasture   Agricultural   Residential   Commercial   Industrial   Other ________

Local Watershed Erosion: None   Moderate   Heavy

Local Watershed NPS Pollution: No evidence   Some Potential Sources   Obvious Sources

Estimated Stream Width 50 m   Estimated Stream Depth: Riffle ___ m   Run ___ m   Pool ___ m

High Water Mark 5 m   Velocity ___   Dam Present: Yes ___ No ✓   Channelized: Yes ___ No ___

Canopy Cover: Open   Partly Open   Partly Shaded   Shaded

SEDIMENT/SUBSTRATE:

Sediment Odors: Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other ________

Sediment Oils: Absent   Slight   Moderate   Profuse

Sediment Deposits: Sludge   Sawdust   Paper Fiber   Sand   Relict Shells   Other Sand silt

Are the undersides of stones which are not deeply embedded black? Yes   No

Inorganic Substrate Components

Substrate Type	Diameter	Percent Composition in Sampling Area
Bedrock		
Boulder	>256-mm (10 in.)	—
Cobble	64-256-mm (2.5-10 in.)	5
Gravel	2-64-mm (0.1-2.5 in.)	60
Sand	0.06-2.00-mm (gritty)	20
Silt	.004-.06-mm	10
Clay	<.004-mm (slick)	5

Organic Substrate Components

Substrate Type	Characteristic	Percent Composition in Sampling Area
Detritus	Sticks, Wood, Coarse Plant Materials (CPOM)	
Muck-Mud	Black, Very Fine Organic (FPOM)	
Marl	Grey, Shell Fragments	

WATER QUALITY

5/14

Temperature 14.9 C   Dissolved Oxygen 11.4   pH 8.73   Conductivity 0.239   Other ________

Instrument(s) Used ________

Stream Type: Coldwater   Warmwater

Water Odors: Normal   Sewage   Petroleum   Chemical   None   Other ________

Water Surface Oils: Slick   Sheen   Globs   Flecks   None

Turbidity: Clear   Slightly Turbid   Turbid   Opaque   Water Color ________

1

WEATHER CONDITIONS Rainy

PHOTOGRAPH NUMBER

OBSERVATIONS AND/OR SKETCH

Figure 5.1-1. Physical Characterization/Water Quality Field Data Sheet for use with all Rapid Bioassessment Protocols.

	Ref (120)		BM1-1 (121)		BM1-2 (122)*		BM1-3 (123)		BM1-5 (125)	
Tissue	35.4	35.8	56.0	58.3	43.8	43.3	34.0	35.4	60.1	60.3
Fluid	19.4	21.5	10.5	11.7	12.6	12.8	11.1	9.0	13.0	7.0
Total	54.8	57.3	66.5	70.0	56.4	56.1	45.1	44.4	73.1	67.3
#	63	50	100	110	77	86	82	90	107	112

	BM1-4
Tissue	16.1
Fluid	4.3
Total	20.4
#	29

*Archive 2nd jar

[redacted]

[illegible]

LEGEND

1 Viscose Basin # 1
2 Viscose Basin # 2
3 Viscose Basin # 3
4 Viscose Basin # 4
5 Viscose Basin # 5
6 Viscose Basin # 6
7 Viscose Basin # 7
8 Viscose Basin # 8
9 Viscose Basin # 9
10 Viscose Basin # 10
11 Viscose Basin # 11
12 Fly Ash Basin # 1
13 Fly Ash Basin # 2
14 Fly Ash Basin # 3
15 Fly Ash Basin # 4
16 Sulfate Basin # 1
17 Sulfate Basin # 2
18 Sulfate Basin # 3
19 Sulfate Basin # 4
20 Sulfate Basin # 4 Extension
21 Sulfate Basin # 5
22 Emergency Lagoon
23 River Pumping House 1
24 Polishing Basin # 1
25 Polishing Basin # 2

Reference: Geraghty & Miller 1983

APPROXIMATE SCALE
(in feet)
0 1,000 2,000

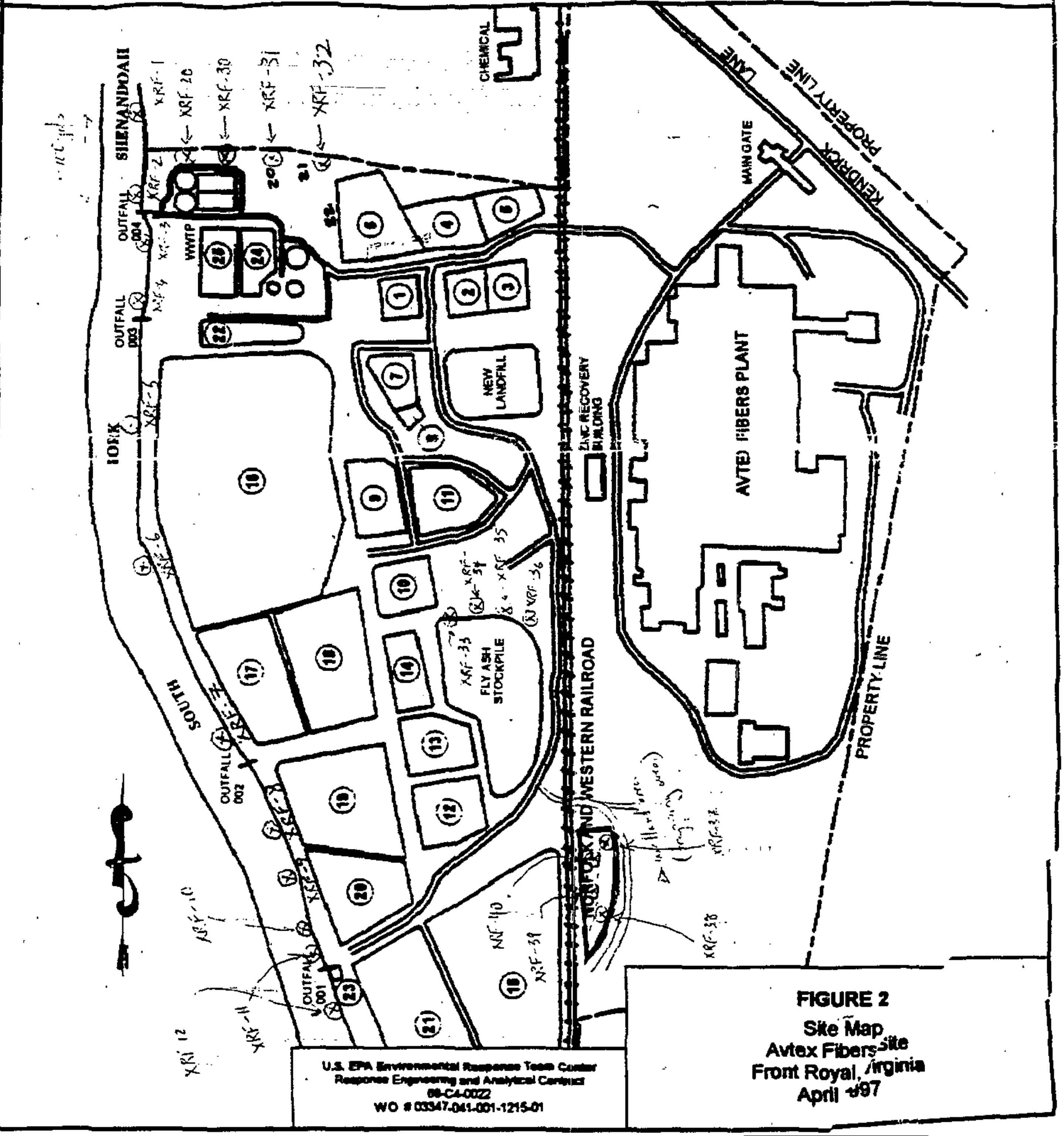


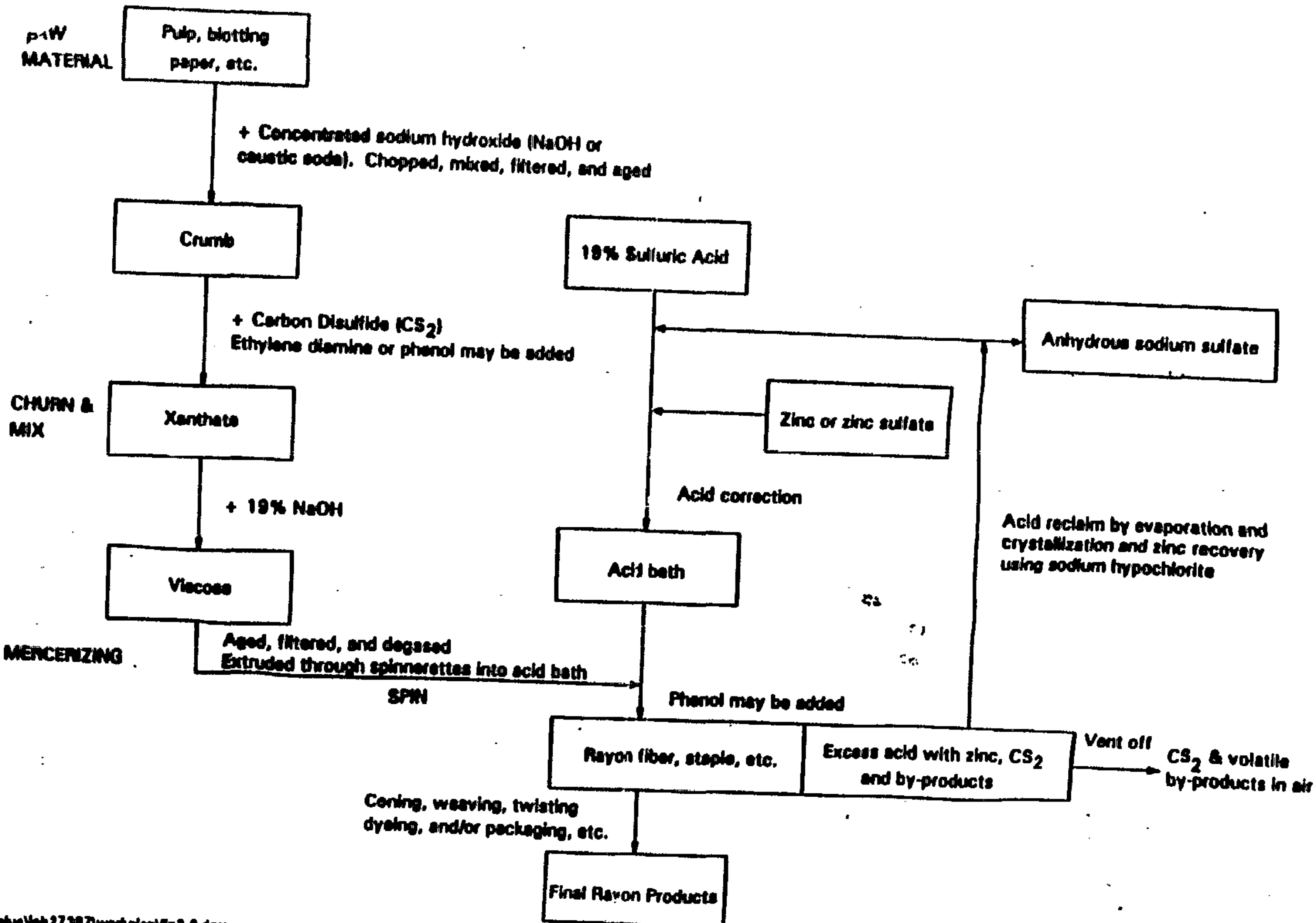
FIGURE 2
Site Map
Avtex Fibers Site
Front Royal, Virginia
April 1997

U.S. EPA Environmental Response Team Center
Response Engineering and Analytical Contract
68-C4-0022
WO # 03347-041-001-1215-01

[redacted]

FIGURE 2-2

CHEMISTRY OF RAYON MANUFACTURING



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[redacted]

AR300546

5/9/17

- GPS training (load software)
- call VA permitting

The Bulletin Board people will tell us what the exact reference position is. This will be entered exactly when processing the differential correction.

UTM Zone? e.g. N17 or 18?

(1) Trimble Navigation, Ltd, George Ott
Herndon, VA 22070
610 Herndon Pkwy, B 3, Ste 600
Phone: (703) 904-1030
(703) 903-1040
BBS:
Ref Pos:
UTM Zone:
No longer operate a base station

(2) EVS Associates
Bill Moore
~~Charlot~~ 1724-2A Allied St., PO ~~#~~ 6277
Charlottesville, VA 22903
(804) 971-8445
(804) 971-8446 ← fax
(804) 971-8462 ← BBS
BBS: (804) 971-8462
Ref Pos:
UTM Zone:

[redacted]

(3) NGS/NOAA
Neil Weston
1315 E. West Hwy, SSMC #3, 8622
Gaithersburg MD ~~8~~6220
(301) 713-3169
(301) 713-4175

BBS: (301) 713-4181 or 4182 ← can get ref. pos.
www.ngs.noaa.gov
Ref Pos:
UTM Zone:

~~(4)~~ (R)
www ngs.noaa.gov/~don/Data4.html
- compressed using "gzip"

(5/11/97)

XRF-1 Fish present (minnow-sized) Downstream of outfall 005?
Outfall is drainage channel.
Silty sand.

XRF-2 sand Downstream of outfall 004
No fish present
concrete outfall

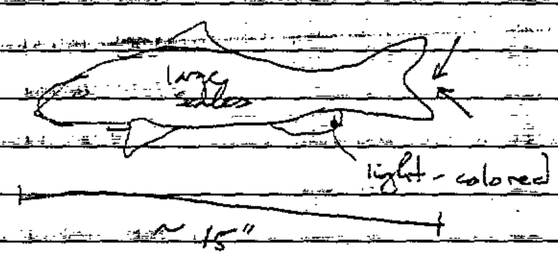
XRF-3 silty sand
Minnow-sized fish & sunfish present
Upstream of outfall 004.

[redacted]

XRF-4 Silty sand
Downstream of "blocked" outfall 003?
No fish present.

XRF-5 Sand
Upstream of outfall 003 but
midway upstream to bend in
river fork.
Fish (minnow-sized) present.
Canada goose & nestling ducks
present.

XRF-6 Slightly upstream of bend in fork
(between outfall 002 and 003)
Sand
3 large fish stationary in fast current



XRF-7 Sand
downstream of outfall 002

XRF-8 Silty sand
~1/3 the distance upstream of 002 and
downstream of outfall 001.
Gyrinid? beetles present.

XRF-9 Sand
~ midway between outfalls 001 and 002
Associated w/ surface runoff area on bank

XRF-10 Sand
downstream of outfall 001 in 8 @ a fallen
limb area
Numerous minnow-sized fish present.

XRF-11 Sand
immediately downstream of outfall 001
Some minnow-sized fish present
Water noticeably darker here and at XRF-10.
Sediment color seems to be the same.
(almost has a blackish tinge).

5/12/97

Super 8 Motel - Front Royal
111 South Street
Front Royal VA 22630
(540) 636-4888 ← phone & fax

Mark Finley (in the field)
(410) 679-9700 Rm 232
Cell (908) 549-3950

Soil - nw side of Flyash (a few) (PCB)
- a few by WWTP (do along up to the basins -
inward of veg area, but not in scoured
out area - some seeps (PCB close to viscose side)
- Δ ex Hand
- near trucks (PCB)

[redacted]

Near WWTP

XRF-30 to 32 - these samples are ~ equidistant from each other, extending from XRF-20 directly east to the viscose basins.

Soil is somewhat compacted in this area, possibly due to earth-moving equipment (scours and tire tracks present).

XRF-32 is directly north of fallen rotting tree (the area is flagged w/ flagging tape).

PCB screening collected @ XRF-32.

XRF-33 On upper ledge on nw side of ash stockpile.

XRF-34 to 36 On lower terrace on nw and n side of ash stockpile.

PCB taken @ XRF-35

All of these samples appear to be mostly ash w/ some organic constituent. XRF-36 is @ most closely resembles soil loam.

Triangle wetland samples

XRF-37 In triangle wetland near ne corner on east side of the ditch.

XRF-38 In triangle wetland near se corner on east side of the ditch

XRF-39 In triangle wetland near sw corner on w side of ditch.

XRF-40 In triangle wetland near nw corner on w side of ditch.

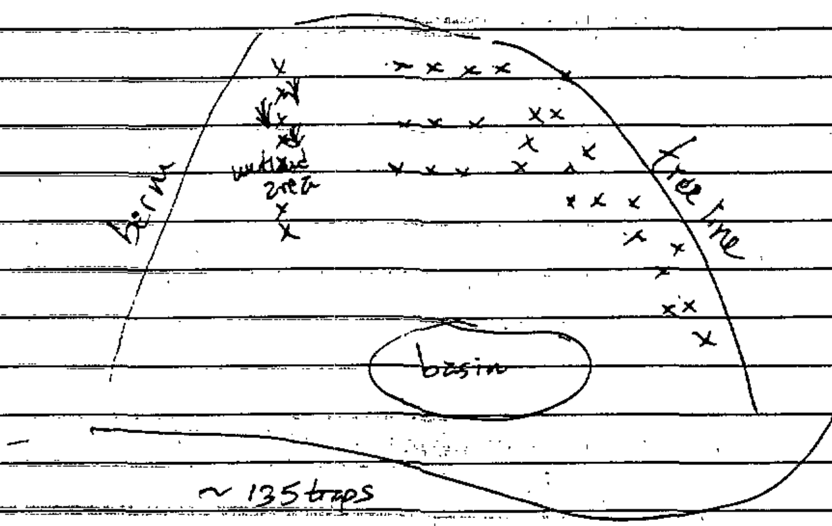
[redacted]

S. fork of Shenandoah

XRF-12 Silty sand
Upstream of outfall 001
Numerous fish (~ < 1" long) present

Dropped off PCB screening samples to HP Env't'l
@ 1500.

Wetland Mammal Sampling Area - Sketch of trap layout



[redacted]

5/13/97

Fish from sulfate basin

1. TL = 7.5"
SL = 5.75"
wt = 68.79 g
Common carp
No external anomalies

2. TL = [11.5"] top portion of caudal fin missing
SL = 8.75"
Wt = 259.51 g
Common Carp
No external anomalies

3. TL = 10.75"
SL = 8.25"
wt = 210.62 g
Common carp
No external anomalies

4. TL = 8.0"
SL = 6.25"
Wt = 88.07 g
common carp
No external anomalies

5. TL = 10.25"
SL = 8.25"
Wt = 224.67 g
Common carp
No external anomalies

Gill rakers short

Redbreast

Fimbriate, black to margin

Longear

Gill rakers mere knobs

shallow fringe, light margin

6. TL = 11.0"
SL = 8.5"
Wt = 223.6 g
Common carp
No external anomalies

Fish from outfall 001

1. TL = 6.5"
SL = 5.25" 215-70
Wt = 103.37 g
Redbreasted ~~Longear~~ sunfish
No external anomalies

2. TL = 3.5"
SL = 2.75"
Wt = 12.25 g
Redbreasted ~~Longear~~ sunfish
No external anomalies

3. TL = 3.5" currently in one ziploc
SL = 2.75"
Wt = 13.32 g
Redbreasted ~~Longear~~ sunfish
No external anomalies

4. TL = 3.25"
SL = 2.65"
Wt = 9.59 g
Redbreasted sunfish
No external anomalies

10. TL = 3.5"
SL = 2.80"
Wt = 11.65 g
Redbreast sunfish
No external anomalies

✓

Lkiy?

11. TL = 3.75"
SL = 3.0" 215-76
Wt = 17.16g ✓
Redbreast sunfish
No external anomalies

✓

12. TL = 4.25"
SL = 3.4" 215-77
Wt = 23.33g ✓
Redbreast sunfish
No external anomalies

✓

13. TL = 5.0"
SL = 4.0"
Wt = 39.81g
all others from outfall 001 are redbreast. → Green sunfish
No external anomalies

✓

5/14/97
Outfall 004

1. TL = 7.5"
SL = 6.25 100
wt = 186.63 g
Redbreast sunfish
No external anomalies
Dead

2. TL = 5.5"
SL = 4.25"
wt = 59.50g 101
Redbreast sunfish
No external anomalies
Dead

3 TL = 4.5"
SL = 3.75"
Wt = 33.280g 102
Redbreast sunfish
No external anomalies
Dead

4. TL = 4.5"
SL = 3.5"
Wt = 28.58g 103
Redbreast sunfish
No external anomalies
Dead

5. TL = 4.5"
SL = 3.75"
Wt = 30.68g 104
Redbreast sunfish
No external anomalies
Dead

6. TL = 4.5"
SL = 3.75"
wt = 31.35g 105
Redbreast sunfish
No external anomalies
Dead

[redacted]

5. TL = 5.0"
SL = 4.0"
Wt = 40.08 g @ 215-71 ✓
Redbreasted Sunfish
Discoloration, possibly due to electroshocking?

6 TL = 5.0"
SL = 4.0"
Wt = 42.33 g 215-72 ✓
Redbreasted Sunfish
leech present on right side pectoral

7 TL = 4.25"
SL = 3.5"
Wt = 23.16 g 215-73 ✓
Redbreast Sunfish
No external anomalies

8. TL = 4.5"
SL = 3.75"
Wt = 31.44 g 215-74 ✓
Redbreast Sunfish
No external anomalies

9. TL = 4.0"
SL = 3.25"
Wt = 18.09 215-75 ✓
Redbreast~~ed~~ @ Sunfish
No external anomalies

[redacted]

7. TL = 4.5"
SL = 3.5"
Wt = 25.51g — 106
Redbreast sunfish
No external anomalies
Dead

8. TL = 4.0"
SL = 3.25"
Wt = 21.39g — 107
Redbreast sunfish
No external anomalies
Dead

OUTFALL 2 (between 7 and 8)

1. TL = 4.75"
SL = 3.75" — 90
Wt = 34.87g
Redbreast sunfish
No external anomalies

2. TL = 4.25"
SL = 3.5"
Wt = 24.94g — 91
Redbreast sunfish
No external anomalies

3. TL = 4.25"
SL = 3.25" — 92
Wt = 36.68g
Redbreast sunfish
No external anomalies

4. TL = 4.5"
SL = 3.75"
Wt = 31.62g 93
Redbreast sunfish
No external anomalies

5. TL = 4.5"
SL = 3.75" 94
Wt = 33.80g
Redbreast sunfish
No external anomalies

6. TL = 4.75"
SL = 3.75"
Wt = 36.09g 95
Redbreast sunfish
3 leeches on fish

7. TL = 4.75"
SL = 3.75"
Wt = 39.73 96
Redbreast sunfish
No external anomalies

8. TL = 4.5"
SL = 3.75"
Wt = 29.35g 97
Redbreast sunfish
No external anomalies

Mammals as of ~~5/14/97~~ 5/15/97:

	Treatment Plant	Fly Ash Pile	Wetland	Reference
Microtus	HHT	HHT IIII		HHT II
Blarina			I	HHT HHT
Peromyscus	I		III	

Sulfate Basin No. 5

TL = 12.5"
SL = 9.5"
Wt = 146.47 g
Common carp
No external anomalies

$$\begin{array}{r} -104.01 \\ +250.48 \\ \hline 146.47 \end{array}$$

Soil from reference area possibly by XRF 41, 42, 43, 27 or 28

5 gal → ~~tox~~ stem
8 oz → TAL
8 oz → TOC
8 oz → PCB / Pest
32 oz → GS
4 oz sept → VOA
8 oz → BNA

4 8 oz

Collected soil from reference @ XRF-27.
treatment @ XRF-~~30~~ 31.
Flyash @ XRF-35.

Hotel
Days Inn Weston
201 W. Main St.
Vernal UT (801)789-1011

5/17/97

Collected benthos at location REF 2

Late entry 5/17/97

H_2O Quality @ Ref 2 (collected ~~@~~ @ on 5/16/97)

pH - 8.81
Cont - .234
Turb - 0
D ox - 12.20
Temp - 17.1
Solu - 0

Collected surface water & sediment at Reference 2

[redacted]

5:7 phone (540) 622-2538

Avtex 5/2/97

Shenandoa

Well Cluster w 010

3 wells went past these

Reference BMI collection

Posted sign 200 yds downstream of boat launch, at upstream end of "Spit".

3 parallel 30 sec D-nets para to shore 1 min kicks A, B + C (eg. Ref A Ref B Ref C).

XRF 11 BMI 1

3:32 Sunny 15 m from shore

XRF 2 BMI 4 4:32 P

clouding

Physical Charact:

forest / WWTP

Erosion moderate

width same

3M water mark

Cover Open

Sed. normal oil absent

embedded Yes black - No

Boulder 20%

Cobble 60

Gravel 10

Sand 5

Silt 5

Osprey sighted.

BMI 4 C has 1) + 2) bottles

XRF 1 30 yds downstream

BMI 5 5:12 PM clouding

Forest both sides moderate

Eros. width same

5M water mark cover open

sed normal oil absent

embedded black - no.

Boulder 1%

Cobble 65%

Gravel 15%

Sand 10

Silt 9%

Artex Sprenger

BMI 6 @ XRF 2:30P

10% boulder

50% cobble

20% gravel

10% sand

0% silt

5/14

Ref BMI 2:43 P

cloudy pH 8.23

Cond 0.234

Turb 2

DO 11.6

Temp 15.3

Sal 0

BMI 1 4:02 P

pH 8.53

Cond 0.243

Turb 1

DO 10.8

Tem 15 °C

Sal 0

5/14 Avetex Sprenger

BMI 2 4:17 P

pH 8.73

Cond 0.239

Turb 0

DO 11.45

Temp 14.9 °C

Sal 0

BMI 3 5:19 P

pH 8.85

Cond 0.237

Turb 1

DO 10.86

Temp 14.8

Sal 0

wildlife observations

Indigo Bunting

Eastern Bluebird

pileated Woodpecker

bob white

eastern cottontail

gray squirrel

deer

beaver (sign)

green frog

cardinal

robin

osprey

+4 4 were highest in
5 32 oz
4 8 oz | 3 8 oz. | 2 8 oz
1 amber | 1
1 poly | 1
3 VOA | VOAs
1 cube

3

Marsh Area Mammal Trapping

ridge

10

12

woodline

road

1 mouse partially eaten at # (peninsula)

Sed Vel. trowel 11:40
Sed BMI 1 trowel 12
(@ XRF 11)

Sed BMI 2 @ XRF-7
12:41 P 5% Boulder
44 % cobble
20 % ...
10 % Sand
5 % silt
Rain forested both sides ... moderate
other para same

BMI 3 @ XRF 4 Sed
1:22 P
1% boulder
30% cobble
50 % gravel
10 % sand
Rain
... - same

Sed BMI 4 @ 2:00P
Sed BMI 5 @ 2:15P

APPENDIX C
Final XRF Validation Report
Avtex Fibers Site
Front Royal, VA
February 1999

215\del\fr\9902\fr2215.wpd

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Roy F. Weston, Inc.
GSA Raritan Depot
Building 209 Annex (Bay F)
2890 Woodbridge Avenue
Edison, New Jersey 08837-3679
908-321-4200 • Fax 908-494-4021

DATE: 26 June 1997

TO: Rajeshmal Singhvi, U.S. EPA/ERTC

THROUGH: Vinod Kansal, REAC Analytical Section Leader
Jay Patel, REAC Inorganic Group Leader

FROM: Dennis Kalnicky, XRF Chemist

SUBJECT: ON-SITE ANALYSES, AVTEX FIBERS SITE, FRONT ROYAL, VA
WORK ASSIGNMENT #2-215 - FPXRF ACTIVITIES

BACKGROUND

Avtex Fibers is located in Front Royal, VA and was a former rayon, polyester, and polypropylene processing facility. Rayon fibers were produced from 1940 until the plant closed in 1989. Polyester was manufactured from 1970 to 1977, and polypropylene was manufactured from 1985 to 1989. Residential areas border the site to the south and the east, General Chemical borders the site to the northeast, and the South Fork of the Shenandoah River borders the site to the north and west. The facility occupies approximately 440 acres. Two Spectrace 9000 Field-Portable X-ray Fluorescence (FPXRF) analyzers, maintained and operated by Response Engineering and Analytical Contract (REAC) personnel, were used to support United States Environmental Protection Agency/Environmental Response Team Center (U.S. EPA/ERTC) activities at the Avtex Fibers site. REAC personnel performed on-site analysis of sediment and soil samples for target elements: zinc (Zn), lead (Pb), copper (Cu), chromium (Cr), arsenic (As), cadmium (Cd), and iron (Fe).

OBSERVATIONS AND ACTIVITIES

Spectrace 9000 FPXRF Analyses

One trip was made to the site from 11 to 15 May, 1997, to determine the extent of target element contamination in site sediment and soil samples utilizing two Spectrace 9000 FPXRF analyzers (S/N Q-003 & Q-023). A total of 37 sediment/soil samples were analyzed on-site. The Spectrace 9000 FPXRF measurement times (instrument live-time) were 200 seconds for the cadmium-109 (Cd-109) source and 60 seconds for the americium-241 (Am-241) and iron-55 (Fe-55) sources.

Sample preparation, analysis, and quality assurance/quality control (QA/QC) procedures used in this study conform to those described in the U.S. EPA/ERTC REAC Standard Operating Procedure (SOP) #1713, *Spectrace 9000 Field Portable X-ray Fluorescence Operating Procedure.*

cc: Central File-WA # 2-215
Nancy J. Finley, U.S. Fish and Wildlife Service
David W. Charters, U.S. EPA/ERTC Work Assignment Manager
Mark Huston, REAC Task Leader

\215\del\tr\9706\xrfrpt.215

[redacted]

Sample Preparation

Soil/sediment samples were received in labeled plastic bags. Each sample was mixed with a stainless steel Stones and debris were removed prior to placing 10-20 grams of the sample into a labeled aluminum weight boat. The samples were dried in an oven for 1-2 hours. Duplicates were prepared for every 10 samples and the suffix "DUP" was added to the sample ID for the duplicate sample. After drying, the sample was passed through a 10-mesh stainless steel sieve to remove rocks and large organic matter. The sample was then placed in a labeled 31 millimeter (mm) polyethylene X-ray sample cup and sealed with 0.2 mil thick polypropylene X-ray window film. Prior to XRF analysis, the sample cup was tapped against the tabletop to pack the sample evenly against the film window. The sample cup was placed directly on the probe aperture window of the Spectrace 9000 FPXRF analyzer, the safety shield was closed, and analysis was initiated with the measurement times previously noted.

FPXRF Analysis Results

XRF analysis results for each measurement were saved in the Spectrace 9000 internal data logger memory. The data was downloaded and archived on computer disks on a daily basis. Selected target element (Cr, Zn, Pb) results for each sample and standard analyzed were logged into the Spectrace 9000 field logbooks (# REACII-L-00203 and REACII-L-00211). Target element results were qualified using the field method detection and quantitation limits discussed in this report.

QA/QC Procedures

The reliability of each Spectrace 9000 FPXRF unit and application model was evaluated daily during the site visit. The energy calibration check and detector resolution check were performed at the beginning of each day to ensure that proper instrument calibration was maintained and that the detector resolution was adequate for producing reliable X-ray intensity measurements. The Spectrace 9000 soil application model was verified at the beginning of each day for the target elements. This was accomplished by analyzing a blank sample and a set of three National Institute of Standards and Technology (NIST) Standard Reference Materials (SRMs) #2709, #2710, and #2711. Energy calibration checks, detector resolution checks, and application verification results were recorded in the Spectrace 9000 field logbooks (#REACII-L-00203 and REACII-L-00211).

Method Detection and Quantitation Limits

A low concentration standard, NIST SRM #2709, was analyzed at the beginning of each day and periodically during sample analysis to establish statistically derived method detection and quantitation limits for the target elements. The standard deviation [STD (n-1)] for these analyses was used to calculate the Spectrace 9000 method detection limit (MDL) and method quantitation limit (MQL) for each target element. The standard deviation for FPXRF analysis of the blank sand sample was used to estimate MDL and MQL for Fe because the Fe concentration was too high in SRM #2709 for MDL determinations. The MDL was calculated as three times the standard deviation (MDL = 3 x STD) and the MQL was defined as ten times the standard deviation (MQL = 10 x STD) for repeat measurements.

The MDL values used to qualify final FPXRF results (Appendix A) represent a conservative combination of the values determined for the two Spectrace 9000 analyzers. For each target element, the larger of the two MDL values was used to qualify the data.

Spectrace 9000 results were qualified by a "U" for analyses less than the MDL (not detected).

Regression analysis could not be performed for Pb, Cu, Cr, As, and Cd because most results were less than the XRF MDL. FPXRF and laboratory data were compared based on XRF MDLs and MQLs. The results of these comparisons are summarized below:

Element	Total number of Confirmation Samples	FPXRF Results	Laboratory Results	FPXRF Confirmed by Laboratory
Pb	9	6 samples < XRF MDL 1 sample = 230 mg/kg 1 sample = 210 mg/kg	< XRF MDL 200 mg/kg 170 mg/kg	yes yes yes
Cu	9	8 samples < XRF MDL 1 sample > MDL and < MQL	< XRF MDL < XRF MDL	yes no
Cr	9	9 samples < XRF MDL	< XRF MDL	yes
As	9	6 samples < XRF MDL 1 sample > MDL and < MQL 2 samples > MDL and < MQL	< XRF MDL < XRF MQL < XRF MDL	yes yes no
Cd	9	9 samples < XRF MDL	< XRF MDL	yes

These comparisons support QA2 data objectives for FPXRF analysis of Pb, Cu, Cr, As, and Cd.

REFERENCES

Kane, J. S. 1993. "Reference Materials." *American Laboratory*, October: pp. 96-97.

U.S. EPA/ERT. 1991. Quality Assurance Technical Information Bulletin, "Field-Portable X-Ray Fluorescence", Volume 1, Number 4.

APPENDIX A
MDL Qualified FPXRF Analysis Results
FPXRF Activities Report
Avtex Fibers Site
June 1997

[redacted]

Avtex Fibers site (wa1215)
Spectrace 9000 FPXRF; S/N Q-003 & Q-023
Cd109-200; Fe55-60; Am241-60 seconds
Final FPXRF data; MDL Qualified; 2 Significant Figures
Sediment / Soil

XRF ID	CLIENT ID	LOCATION	DATE ANALYZED	Zn (mg/kg)	Pb (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	As (mg/kg)	Cd (mg/kg)	Fe (mg/kg)
			MDL	90	45	100	400	60	150	300
XRF1	A11-215-00001	River	11-MAY-1997	130	U	U	U	U	U	17000
XRF10	A11-215-00010	River	12-MAY-1997	U	U	U	U	U	U	17000
XRF11	A11-215-00011	River	12-MAY-1997	U	U	U	U	U	U	17000
XRF12	A11-215-00012	River	12-MAY-1997	95	U	U	U	U	U	30000
XRF20	A11-215-00020	Upland	11-MAY-1997	980	U	U	U	U	U	38000
XRF21	A11-215-00021	Upland	11-MAY-1997	1900	U	U	U	U	U	31000
XRF22	A11-215-00022	Upland	11-MAY-1997	94	U	U	U	U	U	22000
XRF23	A11-215-00023	Wetland	12-MAY-1997	U	U	U	U	79	U	41000
XRF23DUP	A11-215-00023	Wetland	12-MAY-1997	120	U	U	U	U	U	42000
XRF24	A11-215-00024	Wetland	12-MAY-1997	280	U	U	U	U	U	38000
XRF25	A11-215-00025	Fly Ash	12-MAY-1997	170	U	140	U	190	U	68000
XRF26	A11-215-00026	Fly Ash	12-MAY-1997	580	U	U	U	160	U	100000
XRF27	A11-215-00027	Reference Area	12-MAY-1997	110	U	U	U	64	U	43000
XRF28	A11-215-00028	Reference Area	12-MAY-1997	110	U	U	U	U	U	13000
XRF2A	A11-215-00002	River	11-MAY-1997	U	U	U	U	U	U	15000
XRF2B	A11-215-00002	River	11-MAY-1997	U	U	U	U	U	U	18000
XRF3	A11-215-00003	River	11-MAY-1997	U	U	U	U	U	U	15000
XRF30	A11-215-00030	Upland	12-MAY-1997	1800	U	U	U	U	U	35000
XRF31	A11-215-00031	Upland	12-MAY-1997	1500	U	U	U	U	U	35000
XRF32	A11-215-00032	Upland	12-MAY-1997	1100	U	U	U	73	U	32000
XRF33	A11-215-00033	Upland	12-MAY-1997	290	U	U	U	130	U	55000
XRF34	A11-215-00034	Upland	12-MAY-1997	140	U	U	U	120	U	70000
XRF34DUP	A11-215-00034	Upland	12-MAY-1997	160	U	U	U	170	U	79000
XRF35	A11-215-00035	Upland	12-MAY-1997	150	U	U	U	150	U	46000
XRF36	A11-215-00036	Upland	12-MAY-1997	400	U	U	U	92	U	44000
XRF37	A11-215-00037	Upland	12-MAY-1997	310	230	U	U	U	U	25000
XRF38	A11-215-00038	Upland	12-MAY-1997	460	210	U	U	U	U	29000
XRF39	A11-215-00039	Upland	12-MAY-1997	410	U	U	U	U	U	28000
XRF4	A11-215-00004	River	11-MAY-1997	170	U	U	U	U	U	20000
XRF40	A11-215-00040	Upland	12-MAY-1997	420	55	100	U	U	U	120000
XRF41	A11-215-00041	Reference	12-MAY-1997	120	U	U	U	U	U	20000
XRF41DUP	A11-215-00041	Reference	12-MAY-1997	110	U	U	U	U	U	20000
XRF42	A11-215-00042	Reference	12-MAY-1997	U	U	U	U	U	U	11000
XRF43	A11-215-00043	Reference	12-MAY-1997	190	51	U	U	U	U	14000
XRF5	A11-215-00005	River	11-MAY-1997	U	U	U	U	U	U	20000
XRF6	A11-215-00006	River	11-MAY-1997	U	U	U	U	U	U	17000
XRF7	A11-215-00007	River	12-MAY-1997	110	U	U	U	U	U	34000
XRF8	A11-215-00008	River	12-MAY-1997	U	U	U	U	U	U	24000

APPENDIX B
MDL and QA/QC Data
FPXRF Activities Report
Avtex Fibers Site
June 1997

Avtex Fibers site (wa1215)
Spectrace 9000 FPXRF; S/N Q-003 & Q-023
Cd109-200; Fe55-60; Am241-60 seconds
MDL and QA/QC Data
Sediment / Soil
Q-003 data

ID	DATE ANALYZED	Zn (mg/kg)	Pb (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	As (mg/kg)	Cd (mg/kg)	Fe (mg/kg)
MDL SAMPLE								
#2709	11-MAY-1997	88	-11	14	-48	65	132	31767
#2709	11-MAY-1997	105	-5	28	-36	42	92	33140
#2709	11-MAY-1997	90	-3	29	64	43	203	31930
#2709	12-MAY-1997	78	5	20	41	40	35	32200
#2709	12-MAY-1997	90	2	11	-160	40	122	32544
#2709	12-MAY-1997	94	-11	16	57	44	48	31938
#2709	12-MAY-1997	117	1	-8	11	52	95	32957
#2709	13-MAY-1997	95	-7	27	-87	39	57	32133
#2709	13-MAY-1997	95	-13	-8	-176	52	3	32313
#2709	13-MAY-1997	116	0	-21	-37	37	72	32905
#2709	14-MAY-1997	96	-6	-1	-57	57	76	31972
#2709	14-MAY-1997	90	-6	1	-98	37	59	32639
#2709	14-MAY-1997	95	-15	-27	55	74	69	31803
#2709	14-MAY-1997	111	-8	-9	50	37	42	32679
	AVG	97	-5	5	-30	47	79	32351
	STDS	11	5	18	80	11	49	458
	MDL	33	15	54	240	33	147	NA
	MQL	110	50	180	800	110	490	NA
	Number of Obs	14	14	14	14	14	14	14

AVG = average
STDS - Standard Deviation (n-1 method)
MDL - Method detection Limit
MQL - Method Quantitation Limit

Avtex Fibers site (wa1215)
Spectrace 9000 FPXRF; S/N Q-003 & Q-023
Cd109-200; Fe55-60; Am241-60 seconds
MDL and QA/QC Data
Sediment / Soil
Q-003 data

ID	DATE ANALYZED	Zn (mg/kg)	Pb (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	As (mg/kg)	Cd (mg/kg)	Fe (mg/kg)
QC SAMPLE								
#2710	11-MAY-1997	6280	4985	2886	93	261	223	32571
#2710	11-MAY-1997	6200	5088	2785	-32	250	144	31994
#2710	12-MAY-1997	6294	5043	2789	-216	181	-55	32118
#2710	12-MAY-1997	6428	5177	2919	-163	137	33	32436
#2710	12-MAY-1997	6324	5173	2846	-128	141	174	33049
#2710	12-MAY-1997	6410	5130	2878	-86	133	143	32431
#2710	13-MAY-1997	6342	5165	2863	-77	111	111	32181
#2710	13-MAY-1997	6160	5018	2925	-16	279	214	31832
#2710	13-MAY-1997	6262	5064	2692	19	220	183	32422
#2710	14-MAY-1997	6090	5006	2817	-104	246	89	32057
#2710	14-MAY-1997	6317	5058	2909	14	306	75	32860
#2710	14-MAY-1997	6499	5103	2810	-197	278	135	33107
#2710	14-MAY-1997	6248	5102	2828	-114	231	153	32641
	AVG	6296	5086	2842	-77	213	125	32438
	STDS	111	64	66	91	65	76	402
	COV(%)	1.8	1.3	2.3				1.2
	Number of Obs	13	13	13	13	13	13	13
	Certified value	6952	5532	2950	NA	626	22	33800

AVG - average
STDS - Standard deviation (n-1 method)
COV(%) - Coefficient of Variation in percent

Avtex Fibers site (wa1215)
Spectrace 9000 FPXRF; S/N Q-003 & Q-023
Cd109-200; Fe55-60; Am241-60 seconds
MDL and QA/QC Data
Sediment / Soil
Q-003 data

ID	DATE ANALYZED	Zn (mg/kg)	Pb (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	As (mg/kg)	Cd (mg/kg)	Fe (mg/kg)
ZERO CHECK SAMPLE: 60 SECONDS PER SOURCE								
#SAND	11-MAY-1997	-9	-1	-18	173	-2	77	286
#SAND	11-MAY-1997	7	-3	18	88	5	90	203
#SAND	12-MAY-1997	-44	-2	-9	134	12	129	49
#SAND	13-MAY-1997	-44	-0	-3	98	0	85	203
#SAND	14-MAY-1997	-60	-7	21	75	-1	78	241
	AVG	-30	-3	2	114	3	92	196
	Number of Obs	5	5	5	5	5	5	5

AVG - Average

Avtex Fibers site (wa1215)
Spectrace 9000 FPXRF; S/N Q-003 & Q-023
Cd109-200; Fe55-60; Am241-60 seconds
MDL and QA/QC Data
Sediment / Soil
Q-023 data

ID	DATE ANALYZED	Zn (mg/kg)	Pb (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	As (mg/kg)	Cd (mg/kg)	Fe (mg/kg)
MDL SAMPLE								
#2709	11-MAY-1997	160	24	56	99	43	-1	32950
#2709	11-MAY-1997	180	-10	46	1	65	-53	32613
#2709	11-MAY-1997	109	1	56	-63	39	66	32541
#2709	12-MAY-1997	134	34	-21	-186	-7	52	33983
#2709	12-MAY-1997	187	24	40	77	23	51	35178
#2709	12-MAY-1997	138	-9	38	28	65	58	32196
#2709	12-MAY-1997	135	2	10	-22	22	58	32669
#2709	13-MAY-1997	128	32	2	-112	20	3	33341
#2709	13-MAY-1997	148	5	7	395	52	31	34175
#2709	13-MAY-1997	188	15	-11	-60	58	11	32838
#2709	14-MAY-1997	126	3	28	128	30	21	33833
#2709	14-MAY-1997	108	-3	-22	111	49	57	33168
#2709	14-MAY-1997	205	31	91	35	39	11	34425
#2709	14-MAY-1997	175	21	51	55	32	1	33073
	AVG	151	12	26	35	38	26	33370
	STDS	31	15	33	137	19	33	835
	MDL	93	45	99	411	57	99	NA
	MQL	310	150	330	1370	190	330	NA
	Number of Obs	14	14	14	14	14	14	14

AVG = average
STDS - Standard Deviation (n-1 method)
MDL - Method detection Limit
MQL - Method Quantitation Limit

Avtex Fibers site (wa1215)
Spectrace 9000 FPXRF; S/N Q-003 & Q-023
Cd109-200; Fe55-60; Am241-60 seconds
MDL and QA/QC Data
Sediment / Soil
Q-023 data

ID	DATE ANALYZED	Zn (mg/kg)	Pb (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	As (mg/kg)	Cd (mg/kg)	Fe (mg/kg)
QC SAMPLE								
#2710	11-MAY-1997	6742	5304	2941	-252	68	-106	32753
#2710	11-MAY-1997	6748	5108	2991	24	305	68	33256
#2710	11-MAY-1997	6668	5231	2865	-149	150	61	33334
#2710	12-MAY-1997	6472	5242	2902	277	160	113	34538
#2710	12-MAY-1997	6692	5441	3003	171	-66	-65	34468
#2710	12-MAY-1997	6550	5296	3049	-134	78	52	32916
#2710	12-MAY-1997	6736	5302	2790	-179	73	214	33096
#2710	13-MAY-1997	6585	5328	2615	-77	23	23	34450
#2710	13-MAY-1997	6743	5267	3103	-202	138	31	32946
#2710	13-MAY-1997	6242	5147	2958	-2	205	87	33683
#2710	14-MAY-1997	6528	5350	2805	166	72	59	33374
#2710	14-MAY-1997	6321	5208	2967	-39	299	189	33919
#2710	14-MAY-1997	6374	5172	3119	-133	182	-22	32710
#2710	14-MAY-1997	6553	5233	3030	-19	85	113	34846
	AVG	6568	5259	2938	-39	126	58	33592
	STDS	167	87	136	156	101	87	729
	COV(%)	2.5	1.7	4.6				2.2
	Number of Obs	14	14	14	14	14	14	14
	Certified value	6952	5532	2950	NA	626	22	33800

AVG - average
STDS - Standard deviation (n-1 method)
COV(%) - Coefficient of Variation in percent

Avtex Fibers site (wa1215)
Spectrace 9000 FPXRF; S/N Q-003 & Q-023
Cd109-200; Fe55-60; Am241-60 seconds
MDL and QA/QC Data
Sediment / Soil
Q-023 data

ID	DATE ANALYZED	Zn (mg/kg)	Pb (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	As (mg/kg)	Cd (mg/kg)	Fe (mg/kg)
ZERO CHECK SAMPLE: 60 SECONDS PER SOURCE								
#SAND	11-MAY-1997	81	-16	33	-67	-18	82	-239
#SAND	12-MAY-1997	-18	18	-35	253	-13	177	229
#SAND	13-MAY-1997	76	-5	49	47	19	5	-86
#SAND	14-MAY-1997	10	8	50	113	-44	263	-133
#SAND	14-MAY-1997	28	4	-20	149	-24	-14	-132
	AVG	35	2	15	99	-16	103	-72
	Number of Obs	5	5	5	5	5	5	5

AVG - Average

APPENDIX C
Preliminary FPXRF Field Reports
FPXRF Activities Report
Avtex Fibers Site
June 1997

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Metals screening
REAC Work Assignment #1215-01
Spectrace 9000 XRF Soil Screening

Site Name: Avtex Fibers
Units: ppm

Sample Code	Date Run	Zn	Qual	Pb	Qual	Cu	Qual	CrLO	Qual
XRF-2B	11-MAY-1997	ND	-	ND	-	ND	-	ND	-
XRF-3	11-MAY-1997	ND	-	ND	-	ND	-	ND	-
XRF20	11-MAY-1997	980	-	ND	-	ND	-	ND	-
XRF4	11-MAY-1997	170	J	ND	-	ND	-	ND	-
XRF-2A	11-MAY-1997	ND	-	ND	-	ND	-	ND	-
XRF-1	11-MAY-1997	130	J	ND	-	ND	-	ND	-
XRF-21	11-MAY-1997	1900	-	ND	-	ND	-	ND	-
XRF-22	11-MAY-1997	94	J	ND	-	ND	-	ND	-
XRF-6	11-MAY-1997	ND	-	ND	-	ND	-	ND	-
XRF-5	11-MAY-1997	ND	-	ND	-	ND	-	ND	-

Application:SOILS with U,Th,Ag Q23 08-02-1995

	Zn	Pb	Cu	CrLO
Minimum Detection Limit (MDL) =	90	36	100	400
Minimum Quantitation Limit (MQL)=	300	120	330	1330

ND = below MDL
J = above MDL, below MQL
NOTE: Draft results, no QA/QC evaluations performed. All XRF data are subject to change.

[redacted]

Metals screening
REAC Work Assignment #1215-01
Spectrace 9000 XRF Soil Screening

Site Name: Avtex Fibers
Units: ppm

Sample Code	Date Run	Zn	Qual	Pb	Qual	Cu	Qual	CrLO	Qual
RF-23	12-MAY-1997	ND	-	ND	-	ND	-	ND	-
RF-23DUP	12-MAY-1997	120	J	ND	-	ND	-	ND	-
RF27	12-MAY-1997	110	J	ND	-	ND	-	ND	-
RF10	12-MAY-1997	ND	-	ND	-	ND	-	ND	-
RF11	12-MAY-1997	ND	-	ND	-	ND	-	ND	-
RF26	12-MAY-1997	580	-	ND	-	ND	-	ND	-
RF32	12-MAY-1997	1100	-	ND	-	ND	-	ND	-
RF35	12-MAY-1997	150	J	ND	-	ND	-	ND	-
RF36	12-MAY-1997	400	-	ND	-	ND	-	ND	-
RF37	12-MAY-1997	310	-	230	-	ND	-	ND	-
RF42	12-MAY-1997	ND	-	ND	-	ND	-	ND	-
RF41	12-MAY-1997	120	J	ND	-	ND	-	ND	-
RF41DUP	12-MAY-1997	110	J	ND	-	ND	-	ND	-
RF-24	12-MAY-1997	280	J	ND	-	ND	-	ND	-
F25	12-MAY-1997	170	J	ND	-	140	J	ND	-
RF28	12-MAY-1997	110	J	ND	-	ND	-	ND	-
RF7	12-MAY-1997	110	J	ND	-	ND	-	ND	-
RF8	12-MAY-1997	ND	-	ND	-	ND	-	ND	-
RF9	12-MAY-1997	150	J	ND	-	ND	-	ND	-
RF30	12-MAY-1997	1800	-	ND	-	ND	-	ND	-
RF31	12-MAY-1997	1500	-	ND	-	ND	-	ND	-
RF33	12-MAY-1997	290	J	ND	-	ND	-	ND	-
RF34	12-MAY-1997	140	J	39	J	ND	-	ND	-
RF34DUP	12-MAY-1997	160	J	ND	-	ND	-	ND	-
RF38	12-MAY-1997	460	-	210	-	ND	-	ND	-
RF39	12-MAY-1997	410	-	ND	-	ND	-	ND	-
RF40	12-MAY-1997	420	-	55	J	100	J	ND	-
RF43	12-MAY-1997	190	J	51	J	ND	-	ND	-

pplication:SOILS with U,Th,Ag Q23 08-02-1995
9-Q003

	Zn	Pb	Cu	CrLO
inimum Detection Limit (MDL) =	90	36	100	400
inimum Quantitation Limit (MQL)=	300	120	330	1330

) = below MDL
= above MDL, below MQL
TE: Draft results, no QA/QC evaluations performed. All XRF data are subject to change.

[redacted]

Metals screening
REAC Work Assignment #1215-01
Spectrace 9000 XRF Soil Screening

Site Name: Avtex Fibers
Units: ppm

Sample Code	Date Run	Zn Qual	Pb Qual	Cu Qual	CrLO Qual
XRF12	12-MAY-1997	95	J ND	- ND	- ND
XRFSB	12-MAY-1997	160000	- 210	- ND	- ND
XRFFA	12-MAY-1997	400	- 43	J 230	J ND

Application:SOILS with U,Th,Ag Q23 08-02-1995
9-0003

	Zn	Pb	Cu	CrLO
Minimum Detection Limit (MDL) =	90	36	100	400
Minimum Quantitation Limit (MQL)=	300	120	330	1330

ND = below MDL
J = above MDL, below MQL
NOTE: Draft results, no QA/QC evaluations performed. All XRF data are subject to change.

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APPENDIX D
FPXRF Confirmation Sample Data
FPXRF Activities Report
Avtex Fibers Site
June 1997

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WESTON
MANAGERS DESIGNERS CONSULTANTS

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GSA Raritan Depot
Building 209 Annex (Bay F)
2890 Woodbridge Avenue
Edison, New Jersey 08837-3679
908-321-4200 • Fax 908-494-4021

DATE: 06/19/97

TO: Mr. Raj Singhvi, ERTC/EPA

FROM: Jay Patel, Inorganic Group Leader J. Patel

SUBJECT: Preliminary Results of Project Avtex Fibers Site WA# 2-21

Attached please find the preliminary results of the above referenced project for the following samples.

Chain of Custody No.	# of samples	Matrix	Analyses
03914	9	Soil (XRF cups)	As, Cd, Cr, C Fe, Pb, Zn
03913	9	Soil (XRF cups)	As, Cd, Cr, C Fe, Pb, Zn

CC: Central File #2-215

WAM: M Sprenger ERTC/EPA

Task Leader: M. Huston, REAC

D. Kalnicky (XRF Chemist)

B. Lewan, REAC

[redacted]

Table 1.xx Results of the Metals Analysis in Soil
WA# 2215 Avtex Fiber Site
Based on Dry Weight

Client ID		Method Blank		B1		I4		H5		I5		A2	
Location		Lab		B1		I4		H5		I5		A2	
% Solids		100.00		100.00		100.00		100.00		100.00		100.00	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Arsenic	ICAP	U	7.5	U	6.9	U	7.2	U	7.1	U	6.3	U	7.3
Cadmium	ICAP	U	0.50	U	0.46	U	0.48	U	0.47	0.47	0.42	U	0.49
Chromium	ICAP	U	0.50	13	0.46	22	0.48	15	0.47	21	0.42	12	0.49
Copper	ICAP	U	0.90	7.0	0.83	9.7	0.87	12	0.85	23	0.76	11	0.87
Iron	ICAP	11	9.0	22000	8.3	24000	8.7	15000	8.5	24000	7.6	18000	8.7
Lead	ICAP	U	4.0	13	3.7	28	3.8	160	3.8	150	3.4	73	3.9
Zinc	ICAP	2.0	2.0	26	1.8	92	1.9	150	1.9	210	1.7	170	1.9

MDL denotes Method Detection Limit
U denotes less than the MDL (not detected)

Table 1.xx Results of the Metals Analysis in Soil
WA# 2215 Avtex Fiber Site
Based on Dry Weight

Client ID		A3		A4		A0		B0		XRF5		XRF34	
Location		A3		A4		A0		B0		RIVER		UPLAND	
% Solids		100.00		100.00		100.00		100.00		100.00		100.00	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Arsenic	ICAP	U	7.5	U	7.5	U	7.4	U	7.1	U	7.4	50	7.5
Cadmium	ICAP	U	0.50	U	0.50	U	0.50	0.74	0.47	U	0.50	U	0.50
Chromium	ICAP	10	0.50	16	0.50	18	0.50	16	0.47	9.0	0.50	12	0.50
Copper	ICAP	16	0.90	22	0.90	31	0.89	80	0.85	2.8	0.89	28	0.90
Iron	ICAP	14000	9.0	26000	9.0	24000	8.9	21000	8.5	9100	8.9	17000	9.0
Lead	ICAP	46	4.0	46	4.0	140	4.0	390	3.8	8.1	4.0	11	4.0
Zinc	ICAP	290	2.0	410	2.0	690	2.0	680	1.9	19	2.0	22	2.0

MDL denotes Method Detection Limit
U denotes less than the MDL (not detected)

NO QC EVALUATION HAS BEEN PERFORMED.
DATA VALIDITY IS UNSUBSTANTIATED
AND THE DATA SHOULD BE USED
WITH DISCRETION.

[redacted]

SHEET NO. 1

06 0[illegible]7

Sample Identification / Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Metals*			
869	XRF5	RIVER	S	11-MAY-97	1	XRF cup/none	✓			
870	XRF34	UPLAND		12-MAY-97						
871	XRF25	FLY ASH								
872	XRF37	UPLAND								
873	XRF38									
874	XRF32									
875	XRF31									
876	XRF30									
877	XRF21			11-MAY-97						

Matrix:

SD -	Sediment	PW -	Potable Water	S -	Soil
DS -	Drum Solids	GW -	Groundwater	W -	Water
DL -	Drum Liquids	SW -	Surface Water	O -	Oil
X -	Other	SL -	Sludge	A -	Air

Special Instructions:

* Zn, Pb, Cu, Cr, As, Cd, Fe

FOR SUBCONTRACTING USE

FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date
9/analysis	Dennis Kalinsky	6/3/97	B. Lewis	6/3/97	1100	All Analysis	B. Lewis	6/3/97	Colleen Eg[illegible]	6/3/9[illegible]

FORM

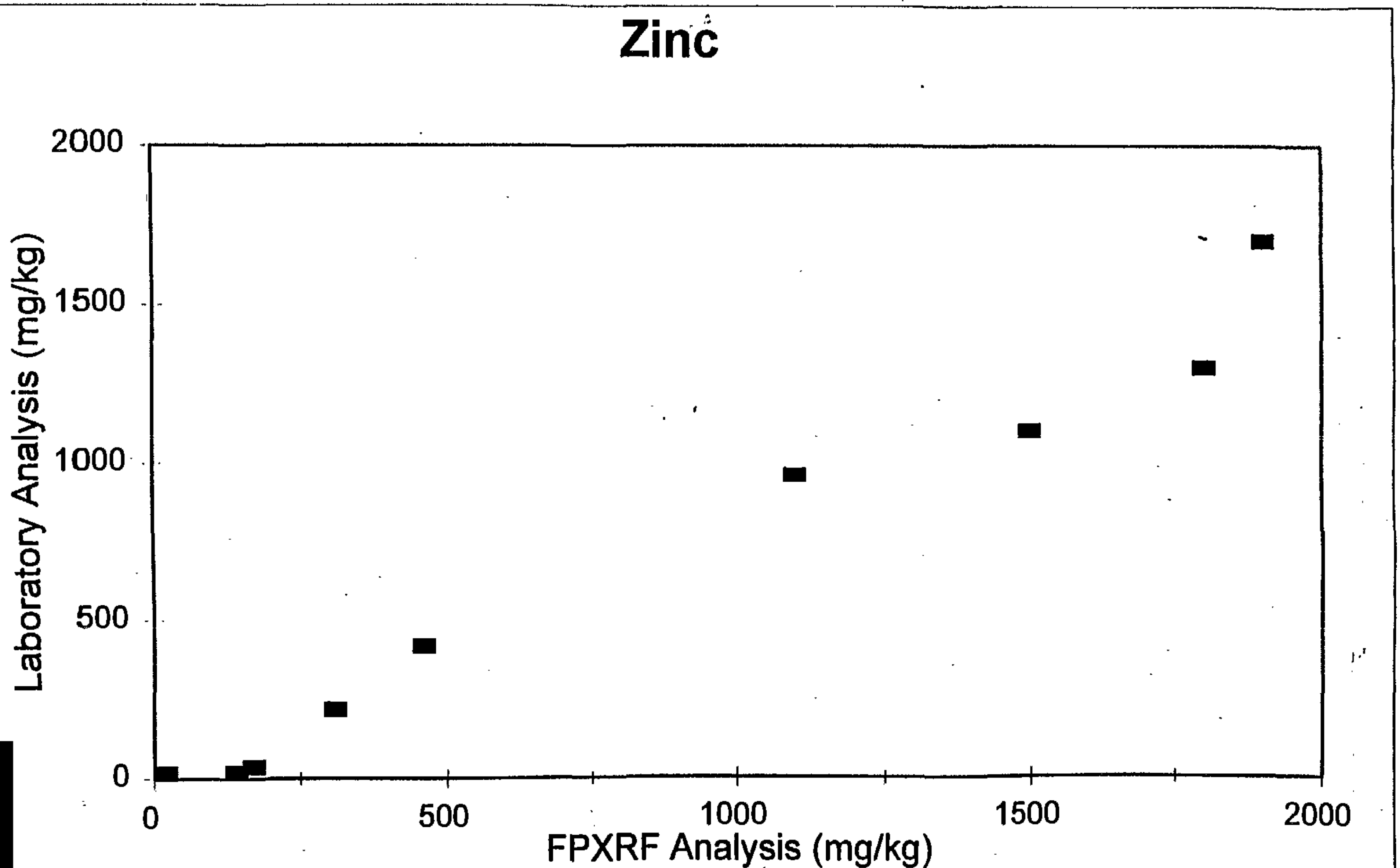
[redacted]

* US GP

Avtex Fibers site (wa1215)
Spectrace 9000 FPXRF; S/N Q-003 & Q-023
Cd109-200; Fe55-60; Am241-60 seconds
Confirmation Samples
FPXRF and Laboratory Results; MDL Qualified; 2 Significant Figures

ID	LOCATION	DATE	Zn (mg/kg)		Pb (mg/kg)		Cu (mg/kg)		Cr (mg/kg)		As (mg/kg)		Cd (mg/kg)		Fe (mg/kg)	
			XRF	Lab	XRF	Lab	XRF	Lab	XRF	Lab	XRF	Lab	XRF	Lab	XRF	Lab
XRF5	River	11-MAY-1997	U	19	U	8	U	3	U	9	U	U	U	U	20000	9100
XRF34	Upland	12-MAY-1997	140	22	U	11	U	28	U	12	120	50	U	U	70000	17000
XRF25	Fly Ash	12-MAY-1997	170	39	U	15	140	39	U	17	190	84	U	U	68000	16000
XRF37	Upland	12-MAY-1997	310	220	230	200	U	19	U	10	U	U	U	U	25000	15000
XRF38	*Upland*	*12-MAY-1997*	*460*	*420*	*210*	*170*	*U*	*25*	*U*	*13*	*U*	*U*	*U*	*U*	*29000*	*21000*
XRF32	Upland	12-MAY-1997	1100	960	U	25	U	20	U	16	73	U	U	U	32000	23000
XRF31	Upland	12-MAY-1997	1500	1100	U	24	U	21	U	17	U	U	U	U	35000	23000
XRF30	Upland	12-MAY-1997	1800	1300	U	24	U	21	U	17	U	U	U	U	35000	22000
XRF21	Upland	11-MAY-1997	1900	1700	U	26	U	13	U	21	U	U	U	U	31000	26000
		MDL	90	2	45	4	100	1	400	0.5	60	7.5	150	0.5	300	9
		MQL	300		150		330		1300		200		500		1000	

MDL - method detection Limit
MQL - method quantitation limit
U - Not Detected (less than the MDL)



Zinc
2000
1500
1000
500
0
Laboratory Analysis (mg/kg)
0
500
1000
1500
2000
FPXRF Analysis (mg/kg)

Avtex XRF and Confirmati ta

Univariate Procedure

ble=DIFF

Moments

	9	Sum Wgts	9
n	19211.11	Sum	172900
Dev	19017.13	Variance	3.6165E8
wness	1.554295	Kurtosis	0.636427
	6.2148E9	CSS	2.8932E9
	98.99025	Std Mean	6339.042
uan=0	3.030602	Pr>|T|	0.0163
^= 0	9	Num > 0	9
gn)	4.5	Pr>=|M|	0.0039
Rank	22.5	Pr>=|S|	0.0039
ormal	0.654767	Pr<W	0.0006

Quantiles(Def=5)

100% Max	53000	99%	53000
75% Q3	13000	95%	53000
50% Med	10900	90%	53000
25% Q1	9000	10%	5000
0% Min	5000	5%	5000
		1%	5000
Range	48000		
Q3-Q1	4000		
Mode	5000		

Extremes

Lowest	Obs	Highest	Obs
5000(	9)	10900(	1)
8000(	5)	12000(	7)
9000(	6)	13000(	8)
10000(	4)	52000(	3)
10900(	1)	53000(	2)

```
Stem Leaf                     #          Boxplot
   5 23                       2             *
   4
   3
   2
   1 0123                     4          +--+--+
   0 589                      3          +-----+
     ----+----+----+----+
Multiply Stem.Leaf by 10**+4
```

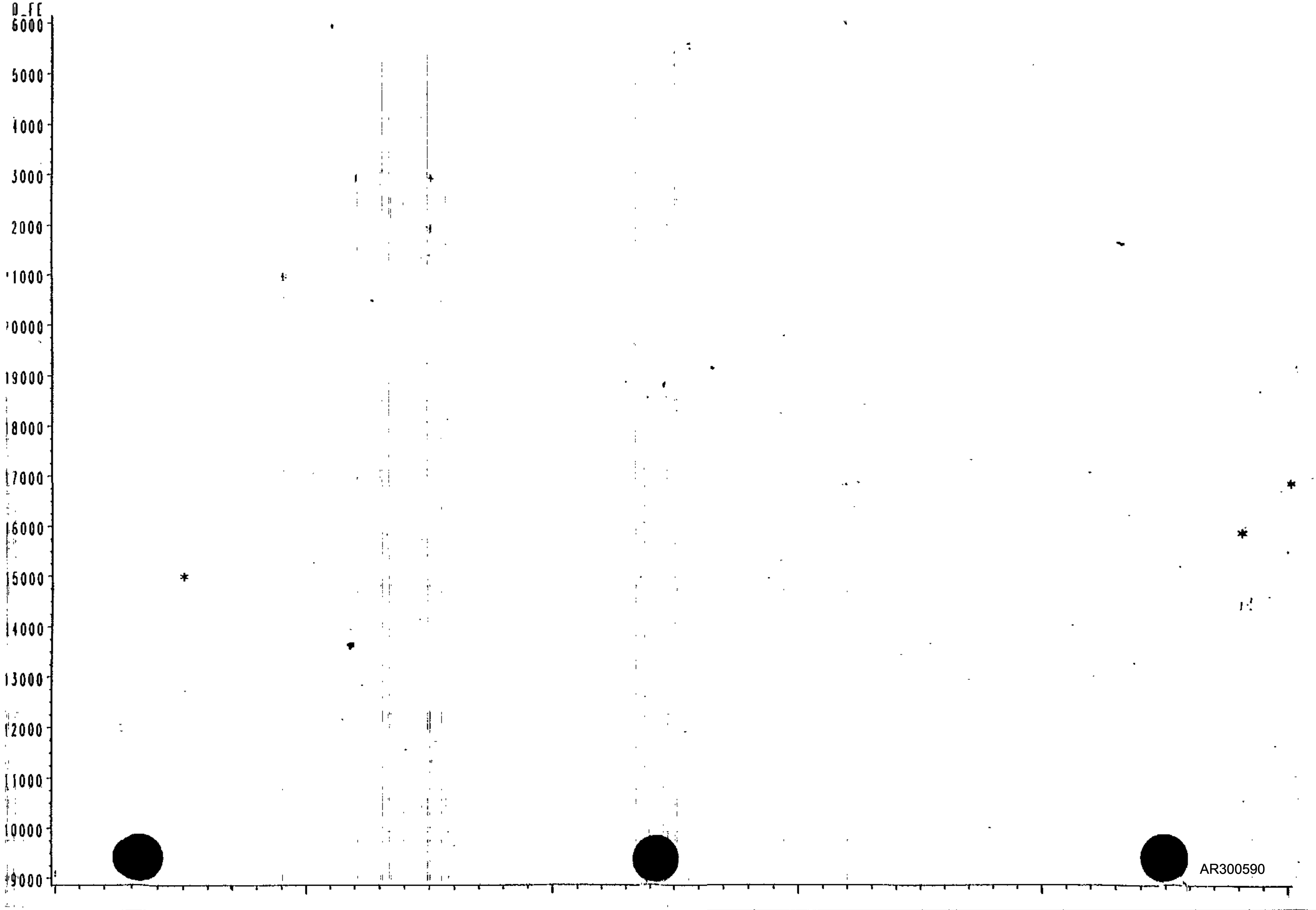
```
                        Normal Probability Plot
55000+                                        *     *  +++++
     |                                           ++++++
     |                                       +++++
     |                                  +++++
     |                             +++++  *  *
 5000+           *       ++*++*+
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

wa215\xrf_lab.sas

AR300589

[redacted] Data File: af.txt

Avlex Site



AR300590

APPENDIX D
Final Analytical Reports
Avtex Fibers Site
Front Royal, VA
February 1999

215\del\fr\9902\fr2215.wpd

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Roy F. Weston, Inc.
GSA Raritan Depot
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2890 Woodbridge Avenue
Edison, New Jersey 08837-3679
732-321-4200 • Fax 732-494-4021

DATE: 28 July 1997

TO: R. Singhvi EPA/ERTC

FROM: V. Kansal Analytical Section Leader Vinod Kansal

SUBJECT: DOCUMENT TRANSMITTAL UNDER WORK ASSIGNMENT # 2-215

Attached please find the Avtex Fibers Analytical Report.

Central File WA# 2-215	(with attachment)
M. Sprenger	Work Assignment Manager
M. Barkley	Data Validation and Report Writing Group Leader
M. Huston	Task Leader

2215\DEL\AR\9707\REPORT

[redacted]

ANALYTICAL REPORT

Prepared by
Roy F. Weston, Inc.

Avtex Fibers
Front Royal, VA

July 1997

EPA Work Assignment No. 2-215
WESTON Work Order No. 03347-142-001-2215-01
EPA Contract No. 68-C4-0022

Submitted to
M. Sprenger
EPA-ERTC

7/28/97
M. Huston — Date
Task Leader

7/28/97
V. Kansal — Date
Analytical Section Leader

7/28/97
E. Gilardi — Date
Project Manager

Analysis by:
REAC
SWOK

Prepared by:
G. Karustis

Reviewed by:
M. Barkley

2215\DEL\AR\9707\REPORT

[redacted]

Table of Contents

Appendices will be furnished on request.

Introduction

REAC, in response to ERTC WA # 2-215, provided analytical support for environmental samples collected at the Avtex Fibers Site in Front Royal, VA as described in the following table. The support also included QA/QC, data review and the preparation of a report summarizing the analytical methods, results, and the QA/QC results.

The samples were treated with procedures consistent with those described in SOP #1008.

COC #**	Number of Samples	Sampling Date	Date Received	Matrix	Analysis	Laboratory
03913	2	5/11/97	6/3/97	Soil	Metals***	REAC
03913	7	5/12/97	6/3/97	Soil	Metals***	REAC
03914	9	5/14/97	6/7/97	Soil	Metals***	REAC
00617	1	5/14/97	5/15/97	CO_2	TAL Metals	REAC
09798	11	5/15/97	5/21/97	Tissue	TAL Metals Pest/PCB	REAC
09798	2	5/16/97	5/21/97	Tissue	TAL Metals Pest/PCB	REAC
1-215-002	2	5/12/97	5/14/97	Sediment	Pest/PCB TAL Metals Grain Size	REAC
1-215-002	2	5/12/97	5/14/97	Water	TAL Metals Pest/PCB	REAC
1-215-002	10	5/13/97	5/14/97	Tissue	TAL Metals Pest/PCB	REAC
1-215-003	12	5/13/97	5/14/97	Tissue	TAL Metals Pest/PCB	REAC
1-215-006	5	5/13/97	5/15/97	Tissue	TAL Metals Pest/PCB	REAC
1-215-006	13	5/14/97	5/15/97	Tissue	TAL Metals Pest/PCB	REAC
1-215-007	20	5/14/97	5/16/97	Tissue	TAL Metals Pest/PCB	REAC

** COC # denotes Chain of Custody Number

*** Metals denotes Zn, Pb, Cu, Cr, As, Cd and Fe

The sample table is continued on the next page

Sample Table (Cont)

COC #**	Number of Samples	Sampling Date	Date Received	Matrix	Analysis	Laboratory
1-215-008	4	5/14/97	5/16/97	Tissue	TAL Metals Pest/PCB	REAC
1-215-008	2	5/14/97	5/16/97	Water	TAL Metals Pest/PCB	REAC
1-215-013	7	5/13/97	5/14/97	Sediment	TAL Metals Pest/PCB	REAC
1-215-013	2	5/14/97	5/14/97	Sediment	TAL Metals	REAC
1-215-013	2	5/14/97	5/14/97	Sediment	TAL Metals Pest/PCB	REAC
1-215-014	2	5/14/97	5/16/97	Sediment	Pest/PCB	REAC
1-215-017	4	5/14/97	5/16/97	Water	TAL Metals Pest/PCB	REAC
1-215-017	1	5/15/97	5/16/97	Water	TAL Metals	REAC
1-215-018	4	5/14/97	5/16/97	Water	TAL Metals Pest/PCB	REAC
1-215-018	1	5/15/97	5/16/97	Water	Pest/PCB	REAC
1-215-019	14	5/15/97	5/16/97	Tissue	TAL Metals Pest/PCB	REAC

** COC # denotes Chain of Custody Number

*** Metals denotes Zn, Pb, Cu, Cr, As, Cd and Fe

The sample table is continued on the next page

Sample Table (Cont)

COC #**	Number of Samples	Sampling Date	Date Received	Matrix	Analysis	Laboratory
1-215-020	5	5/15/97	5/16/97	Tissue	TAL Metals Pest/PCB	REAC
1-215-023	2	5/12/97	5/17/97	Soil	VOC	SWOK****
1-215-023	2	5/12/97	5/17/97	Water	VOC	SWOK****
1-215-023	7	5/13/97	5/17/97	Soil	VOC	SWOK****
1-215-023	3	5/14/97	5/17/97	Soil	VOC	SWOK****
1-215-023	2	5/14/97	5/17/97	Water	VOC	SWOK****
1-215-023	1	5/15/97	5/17/97	Soil	VOC	SWOK****
1-215-024	8	5/14/97	5/17/97	Water	VOC	SWOK****
1-215-024	4	5/14/97	5/17/97	Water	VOC	SWOK****
1-215-024	1	5/15/97	5/17/97	Water	VOC	SWOK****
1-215-024	6	5/15/97	5/17/97	Soil	VOC	SWOK****
1-215-025	4	5/14/97	5/17/97	Water	VOC	SWOK****
1-215-025	1	5/15/97	5/17/97	Water	VOC	SWOK****
1-215-025	6	5/15/97	5/17/97	Soil	VOC	SWOK****

** COC # denotes Chain of Custody Number
**** denotes Southwest Laboratory of Oklahoma, Inc.

The sample table is continued on the next page

Sample Table (Cont)

COC #**	Number of Samples	Sampling Date	Date Received	Matrix	Analysis	Laboratory
1-215-026	1	5/14/97	5/17/97	Water	VOC	SWOK****
1-215-026	4	5/14/97	5/17/97	Sediment	VOC	SWOK****
1-215-037	1	5/15/97	5/19/97	Sediment	Pest/PCB	REAC
1-215-037	1	5/15/97	5/19/97	Tissue	Pest/PCB	REAC
1-215-037	3	5/15/97	5/19/97	Soil	Pest/PCB BNA	REAC
1-215-037	4	5/15/97	5/19/97	Soil	TALMetals, Pest/PCB, BNA	REAC
1-215-038	4	5/15/97	5/19/97	Soil	TAL Metals	REAC

** COC # denotes Chain of Custody Number
**** denotes Southwest Laboratory of Oklahoma, Inc.

Case Narrative

VOC Package G 231

Water Samples

The response factor for acetone (0.038) is below the QC limit; all reported concentrations of acetone should be regarded as estimated and all non-detected values should be regarded as unusable.

The trip blank (11-215-00417) contained 7μg/L acetone. The data are not affected because this analyte was not detected in the associated samples. The acetone detected in water samples 11-215-00411, 11-215-00414 and 11-215-00418 are considered to be not-detected (U) because the concentration is less than 10 times that found in the blank.

The field blank (11-215-00418) contained 4μg/L chloroform, 2μg/L bromodichloromethane and 0.75μg/L dibromochloromethane. The data are not affected because these analytes were not detected in the associated samples.

Soil Samples

The continuing calibration check standard of 5/21/97 exceeded the acceptable QC limits for dichlorodifluoromethane (32%). The data are not affected because this compound was not detected in the samples that were quantified by this calibration.

The continuing calibration check standard of 5/22/97 exceeded the acceptable QC limits for dichlorodifluoromethane (30%). The data are not affected because these compound was not detected in the samples that were quantified by this calibration.

The percent recoveries of one or more surrogates exceeded the acceptable QC limits for the following soil samples: 11-215-00044, 11-215-00045, 11-215-00401, 11-215-00404, 11-215-00501, 11-215-00501 MS, 11-215-00501 MSD, 11-215-00506, 11-215-00606, 11-215-00607, 11-215-00605 MS and 11-215-00605 MSD. All results for these sample should be regarded as estimated. The matrix interference in sample 11-215-00506 was confirmed by re-analysis.

The areas of one internal standard exceeded the acceptable QC limits for the following soil samples: 11-215-00401, 11-215-00407, 11-215-00608, 11-215-00501, 11-215-00501 MS, 11-215-00501 MSD and 11-215-00605 MSD. The results for compounds quantified by the internal standard for these samples should be regarded as estimated.

The areas of two internal standards exceeded the acceptable QC limits for the following soil sample: 11-215-00607. The results for compounds quantified by the internal standards for this sample should be regarded as estimated.

The areas of four internal standards exceeded the acceptable QC limits for the following soil samples: 11-215-00045 and 11-215-00605 MSD. All results for sample 11-215-00605 MSD should be regarded as estimated. For all compounds quantified with 1,4-dichlorobenzene-d_4 the positive results for sample 11-215-00045 should be regarded as estimated; non-detected values should be regarded as unusable (because the value was less than 10% of the standard area). The remainder of the results should be regarded as estimated.

The areas of two internal standards exceeded the acceptable QC limits for the following soil sample: 11-2[illegible] 00606. For all compounds quantified with 1,4-dichlorobenzene-d_4 the positive results for this sample sh[illegible] be regarded as estimated; non-detected values should be regarded as unusable (because the area was less than 10% of the standard area). Results for the compounds quantified with chlorobenzene-d_5 should be regarded as estimated.

The areas of four internal standards exceeded the acceptable QC limits for the following soil samples: 11-215-00506. The positive results for this sample should be regarded as estimated; non-detected values should be regarded as unusable (because all values were less than 10% of the standard area).

<u>BNA Package G 234</u>

The continuing calibration check standard of 6/3/97 exceeded the acceptable QC limits for di-n-octyl phthalate (30%) and benzo(g,h,i)perylene (28%). The data are not affected because these compounds were not detected in the samples that were quantified by this calibration.

The percent recovery of one acid surrogate exceeded the acceptable QC limits for samples 11-215-00503 and 11-215-005 MSD. The data for these samples are not affected.

The percent recovery of two acid surrogates exceeded the acceptable QC limits for sample 11-215-00506. The data for non detected analytes should be regarded as unusable; the data for detected analytes should be regarded as estimated because one surrogate was not recovered.

The percent recovery of one acid surrogate and one base-neutral surrogate exceeded the acceptable QC limits for samples 11-215-00504. The data for this sample are not affected.

<u>Pesticide/PCB Package G 258</u>

In the initial calibration check standard of 6/13/97 the acceptable QC limits were exceeded by aldrin (37%), heptachlor epoxide (27%), γ-chlordane (29%) and α-chlordane (28%). The data are not affected because these analytes were not detected in the samples associated with this calibration.

In the end of sequence calibration check standard of 5/16/97 the acceptable QC limits were exceeded by heptachlor (44%). The data are not affected because no samples were quantified by this check standard.

In the end of sequence calibration check standard of 5/18/97 the acceptable QC limits were exceeded by endrin (37%). The data are not affected because no samples were quantified by this check standard.

In the end of sequence calibration check standard of 5/21/97 the acceptable QC limits were exceeded by endrin (40%) and methoxychlor (41%). The data are not affected because no samples were quantified by this check standard.

In the end of sequence calibration check standard of 5/22/97 the acceptable QC limits were exceeded by tetrachloro-m-xylene (36%), α-BHC (68%), γ-BHC (94%), β-BHC (87%), heptachlor (100%), δ-BHC (68%), aldrin (35%), heptachlor epoxide (60%), γ-chlordane (50%), α-chlordane (57%), endosulfan (I) (49%), p,p'-DDE (29%), dieldrin (42%), endrin (93%), p,p'-DDD (71%), endosulfan (II) (65%), p,p'-DDT (91%), endrin aldehyde (50%), endosulfan sulfate (79%), methoxychlor (100%), endrin ketone (100%) and decachlorobiphenyl (37%). The data are not affected because no samples were quantified by this check standard.

In the end of sequence calibration check standard of 6/05/97 the acceptable QC limits were exceeded by tetrachloro-m-xylene (56%), α-BHC (98%), γ-BHC (81%), β-BHC (42%), δ-BHC (120%), heptachlor epoxide (29%), endosulfan (I) (32%), p,p'-DDE (93%), dieldrin (47%), endrin (62%), p,p'-DDD (222%), endosulfan (II) (67%), p,p'-DDT (83%), endrin aldehyde (111%), endosulfan sulfate (79%), methoxychlor (100%) and decachlorobiphenyl (96%). The data are not affected because no samples were quantified by this check standard.

In the end of sequence calibration check standard of 6/13/97 the acceptable QC limits were exceeded by tetrachloro-m-xylene (27%), α-BHC (35%), γ-BHC (59%), β-BHC (53%), heptachlor (82%), δ-BHC (36%), aldrin (29%), heptachlor epoxide (35%), γ-chlordane (39%), α-chlordane (42%), endosulfan (I) (35%), dieldrin (32%), endrin (59%), p,p'-DDD (25%), endosulfan (II) (41%), p,p'-DDT (88%), endrin aldehyde (39%), endosulfan sulfate (50%), methoxychlor (64%), endrin ketone (88%) and decachlorobiphenyl (49%). The data are not affected because no samples were quantified by this check standard.

In the end of sequence calibration check standard of 6/12/97 (file ID SSS1A20.A.D) the acceptable QC limits were exceeded by all five peaks of aroclor 1254 (33-106%). The data are not affected because no samples were quantified by this check standard.

In the end of sequence calibration check standard of 6/12/97 (file IS SSS1A21A.D) the acceptable QC limits were exceeded by all five peaks of aroclor 1254 (36-77%). The data are not affected because no samples were quantified by this check standard.

In the end of sequence calibration check standard of 6/18/97 the acceptable QC limits were exceeded by all five peaks of aroclor 1254 (47-53%). The data are not affected because no samples were quantified by this check standard.

For water sample 11-215-00604 decachlorobiphenyl was not recovered and the percent recovery of tetrachloro-m-xylene was 5. These results were confirmed by re-analysis. The pesticide/PCB results for this sample should be regarded as unusable ("R").

The percent recovery of one surrogate exceeded the acceptable QC limits for soil samples 11-215-00605 MS, 11-215-00605 MSD, 11-215-00404, 11-215-00405, 11-215-00401, 11-215-00402, 11-215-00407, 11-215-00606, 11-215-00410, 11-215-00505, 11-215-00505 MS, 11-215-00505 MSD and 11-215-00504. The pesticide/PCB results for these samples are not affected.

The percent recovery of both surrogates exceeded the acceptable QC limits for soil samples 11-215-00045, 11-215-00607 and 11-215-00608. The pesticide/PCB results for these samples should be regarded as estimated.

In water samples: 11-215-00046, 11-215-00047, 11-215-00414, 11-215-00410, 11-215-00411, 11-215-00412, 11-215-00413, 11-215-00419, 11-215-00415, 11-215-00601, 11-215-00603, 11-215-00602, the water blank 05149701, and in soil samples: 11-215-00403, 11-215-00605, 11-215-00608, 11-215-00045, 11-215-00401, 11-215-00402, 11-215-00504, the soil blank 05179701, 11-215-00414, 11-215-00414 MS and 11-215-00414 MSD the decachlorobiphenyl peak was outside the retention time window on one or both columns. Professional judgement was invoked to identify the pesticides and aroclors; the pesticide/PCB results for these samples are not affected.

In samples 11-215-00606, 11-215-00607 and 11-215-00044 both surrogate peaks were outside the retention time window on one or both both columns. Professional judgement was invoked to identify the pesticides and aroclors; the pesticide/PCB results for these samples are not affected.

Because of the low response of Aroclor 1248 on the DB-608 column, Aroclor 1248 was quantified, with the permission of the Organic Section Group Leader, using the Rtx column. The data are not affected.

Pesticide/PCB Package G 264

The method blank of 5/15/97 contained 1.5 mg/kg methoxychlor. The data are not affected because these analytes were not detected in the associated samples.

In the continuing calibration check standard of 6/6/97 the acceptable QC limits were exceeded by p,p'-DDT (31%). This analyte was not detected in the samples associated with this calibration. All non-detected values for this analyte in the associated samples should be regarded as estimated.

The percent recovery of one surrogate exceeded the acceptable QC limits for tissue samples 11-215-00209, 11-215-00210, 11-215-00211, 11-215-00212, 11-215-00214, 11-215-00215, 11-215-00216, 11-215-00217, 11-215-00218, MBLK 051797, 11-215-00219, 11-215-00220, 11-215-00221, 11-215-00222, 11-215-00223, 11-215-00224, 11-215-00225, 11-215-00226, 11-215-00227, 11-215-00228, 11-215-00229, 11-215-00230, 11-215-00231, 11-215-00232, 11-215-00233, 11-215-00234, 11-215-00235, 11-215-00236, 11-215-00091, 11-215-00092, 11-215-00093, 11-215-00094, MBLK 051997, 11-215-00090, 11-215-00095, 11-215-00096, 11-215-00097, 11-215-00100, 11-215-00101, 11-215-00102, 11-215-00103, 11-215-00104, 11-215-00105, 11-215-00106, 11-215-00107, 11-215-00108, 11-215-00109, 11-215-00110, 11-215-00111, 11-215-00112, 11-215-00113, 11-215-00114, 11-215-00115, 11-215-00116, 11-215-00117, MBLK 052097, 11-215-00130, 11-215-00131, 11-215-00132, 11-215-00133, 11-215-00134, 11-215-00135, 11-215-00136, 11-215-00137, 11-215-00138, 11-215-00139, 11-215-00140, 11-215-00237, 11-215-00238, MBLK 052197, 11-215-00065, MBLK 052297, 11-215-00201 MS, 11-215-00201 MSD, 11-215-00100 MS, 11-215-00100 MSD, 11-215-00133 MS, 11-215-00133 MSD, 11-215-00238 MS, 11-215-00238 MSD, 11-215-00070 MS, 11-215-00070 MSD, 11-215-00115 MS, 11-215-00115 MSD, 11-215-00232 MS, 11-215-00232 MSD, 11-215-00234 MS, 11-215-00234 MSD, 11-215-00140 MS, 11-215-00140 MSD, MBLK 051597, 11-215-00060, 11-215-000 11-215-00064, 11-215-00071, 11-215-00072, 11-215-00073, 11-215-00074, 11-215-00075, 11-215-00076, 11-215-00077, 11-215-00080, 11-215-00081, 11-215-00082, 11-215-00083, 11-215-00084, 11-215-00085, 11-215-00086, 11-215-00087, MBLK 051697, 11-215-00201, 11-215-00202, 11-215-00203, 11-215-00204, 11-215-00205, 11-215-00206, 11-215-00207 and 11-215-00208. The pesticide/PCB results for these samples are not affected.

The percent recovery of both surrogates exceeded the acceptable QC limits for tissue samples 11-215-00066, 11-215-00065, 11-215-00062, 11-215-00065 MSD and 11-215-00061. The pesticide/PCB results for these samples should be regarded as estimated.

Metals Package G 242

The method blank contained 0.26 mg/kg lead. The lead result for sample 11-215-00102 should be regarded as estimated because the lead concentration is less than five times that of the blank.

Metals Package G 238

The data were examined and were found to be acceptable.

Metals Package G 239

The carbon dioxide blank contained 0.0045 mg/sample aluminum, 0.00022 mg/sample barium, 0.048 mg/sample calcium, 0.002 mg/sample chromium, 0.017 mg/sample iron, 0.0004 mg/sample lead, 0.00014 mg/sample manganese, 0.057 mg/sample sodium and 0.00083 mg/sample zinc. No qualifiers were applied to the data.

Metals Package G 240

The data were examined and were found to be acceptable.

Metals Package G 241

The data were examined and were found to be acceptable.

Metals Package G 244

The data were examined and were found to be acceptable.

Metals Package G 262

The method blank contained 11 mg/kg iron and 2.0 mg/kg zinc. The data are not affected because the associated samples contained concentrations of iron and zinc that were more than 5 times that of the method blank.

Metals Package G 265

The blank (11-215-00507) contained 35 mg/kg aluminum, 54 mg/kg calcium and 51 mg/kg iron. . No qualifiers were applied to the data.

Summary of Abbreviations

AA	Atomic Absorption
B	The analyte was found in the blank
BFB	Bromofluorobenzene
BPQL	Below the Practical Quantitation Limit
C	Centigrade
D	(Surrogate Table) this value is from a diluted sample and was not calculated (Result Table) this result was obtained from a diluted sample
Dioxin	denotes Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans and/or PCDD and PCDF
CLP	Contract Laboratory Protocol
COC	Chain of Custody
CONC	Concentration
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
DFTPP	Decafluorotriphenylphosphine
DL	Detection Limit
E	The value is greater than the highest linear standard and is estimated
EMPC	Estimated maximum possible concentration
ICAP	Inductively Coupled Argon Plasma
ISTD	Internal Standard
J	The value is below the method detection limit and is estimated
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MI	Matrix Interference
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MW	Molecular Weight
NA	either Not Applicable or Not Available
NC	Not Calculated
NR	Not Requested
NS	Not Spiked
% D	Percent Difference
% REC	Percent Recovery
PQL	Practical Quantitation Limit
PPBV	Parts per billion by volume
QL	Quantitation Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SIM	Selected Ion Mode
TCLP	Toxic Characteristics Leaching Procedure
U	Denotes not detected

m^3	cubic meter	kg	kilogram	μg	microgram
L	liter	g	gram	pg	picogram
mL	milliliter	mg	milligram		
μL	microliter				
*	denotes a value that exceeds the acceptable QC limit				

Abbreviations that are specific to a particular table are explained in footnotes on that table

Revision 3/7/97

Analytical Procedure for VOC in Water

The subcontract laboratory determined the concentrations of VOCs in the water samples using USEPA Method 8260 found in SW-846. The results of the analysis are listed in Table 1.1.

Analytical Procedure for VOC in Soil

The subcontract laboratory determined the concentrations of VOCs in the soil samples using USEPA Method 8260 found in SW-846. The results of the analysis are listed in Table 1.2.

Analytical Procedure for BNA in Soil

Extraction Procedure

Prior to extraction each sample was spiked with a six component surrogate mixture consisting of nitrobenzene-d_5, 2-fluorobiphenyl, terphenyl-d_{14}, phenol-d_5, 2-fluorophenol, and 2,4,6-tribromophenol. Thirty grams of sample was mixed with 30 g anhydrous sodium sulfate, and Soxhlet extracted for 16 hours with 300 mL of 1:1 acetone:methylene chloride. The extract was concentrated to 5.0 mL., an internal standard mixture consisting of 1,4-dichlorobenzene-d_4, naphthalene-d_8, acenaphthene-d_{10}, phenanthrene-d_{10}, chrysene-d_{12}, and perylene-d_{12} was added, and analyzed.

Analysis Procedure

An HP 5995C Gas Chromatograph/Mass Spectrometer (GC/MS), equipped with a 7673A autosampler and controlled by an HP-1000 RTE-6/VM computer was used to analyze the samples.

The instrument conditions were:

Column	Restek Rtx-5 (crossbonded SE-54) 30 meter x 0.32mm ID, 0.50 μm film thickness
Injection Temperature	290° C
Transfer Temperature	290° C
Source Temperature	240° C
Analyzer Temperature	240° C
Temperature Program	40°C for 3 min 8° C/min to 295° C hold for 12 min
Splitless Injection	Split time = 1.00 min
Injection Volume	1μL

The GC/MS system was calibrated using 5 BNA standard mixtures at 20, 50, 80, 120, and 160 μg/mL. Before analysis each day, the system was tuned with 50 ng decafluorotriphenylphosphine (DFTPP) passed a continuing calibration check when analyzing a 50 μg/mL standard mixture in which the responses were evaluated by comparison to the average response of the calibration curve.

The BNA results, based on dry weight, are listed in Table 1.3; the tentatively identified compounds are listed in Table 1.4. The concentration of the detected compounds was calculated using the following equation:

$$C_{\mu} = \frac{DF x A_{u} x I_{is} x V_{t}}{A_{is} x RF(\ or RF_{ave}) x V_{i} x W x D}$$

where

C_u	=	Concentration of target analyte (μg/Kg)
DF	=	Dilution Factor
A_u	=	Area of target analyte
I_{is}	=	Mass of specific internal standard (ng)
V_t	=	Volume of extract (μl)
A_{is}	=	Area of specific internal standard
RF	=	Response Factor (unitless)
RF_{ave}	=	average Response Factor
V_i	=	Volume of extract injected (μl)
W	=	Weight of sample (g)
D	=	Decimal per cent solids

The RF_{ave} is used when a sample is associated with an initial calibration curve. The RF is used when a sample is associated with a continuing calibration.

Response Factor calculation:

The RF for each specific analyte is quantitated based on the area response from the continuing calibration check as follows:

$$RF = \frac{A_c \ x \ I_{is}}{A_{is} \ x \ I_c}$$

where

RF	=	Response factor for a specific analyte
A_c	=	Area of the analyte in the standard
I_{is}	=	Mass of the specific internal standard
A_{is}	=	Area of the specific internal standard
I_c	=	Mass of the analyte in the standard

$$RF_{ave} = \frac{RF_1 + ... + RF_n}{n}$$

and

n = number of Samples

Revision of 7/08/94

Analytical Procedure for Pesticides/PCBs in Water

Extraction Procedure

One liter of sample was spiked with a surrogate solution consisting of tetrachloro-m-xylene and decachlorobiphenyl, and was extracted three times with 60 mL portions of methylene chloride. The combined extracts were filtered, concentrated to 10 mL, solvent exchanged with 60 mL hexane, and the hexane concentrated to 1.0 mL.

Gas Chromatographic Analysis

The extract was analyzed for pesticides using simultaneous dual column injections. The analysis was done on an HP 5890 GC/ECD system, equipped with an HP 7673A automatic sampler, and controlled with an HP-ChemStation. The following conditions were employed:

First Column	DB-608, 30 meter, 0.53mm fused silica capillary, 0.83 μm film thickness
Injector Temperature	250° C
Detector Temperature	325° C
Temperature Program	150°C for 1 minute 7°C/min to 265°C 18 min at 265°
Second Column	Rtx-CLP Pesticides, 30 meter, 0.53mm fused silica capillary, 0.50 μm film thickness
Injector Temperature	250° C
Detector Temperature	325° C
Temperature Program	150° C for 1 minute 7°C/min to 265°C 18 min at 265°

The gas chromatographs were calibrated using 5 pesticide standards at 20, 50, 100, 200, and 500 μg/L. The response from each mixture were used to calculate the response factors (RF) of each analyte. The average RF was used to calculate the concentrations of the pesticides in the samples. Quantification was based on the DB-608 column (signal 1), and identity of the analyte was confirmed using the Rtx-1701 column (signal 2). A fingerprint gas chromatogram was run using each of the seven Aroclor mixtures, and toxaphene; calibration curves were run only if a particular Aroclor, or toxaphene was found in the sample.

The Pesticide/PCB results, listed in Table 1.5, were calculated from the following formula:

$$C_u = \frac{DFxA_u xV_t}{RF_{ave} xV_i xV_s}$$

where

C_u	=	Concentration of analyte (μg/L)
DF	=	Dilution Factor
A_u	=	Area or peak height
V_t	=	Volume of sample (mL)
RF_{ave}	=	Average response factor
V_i	=	Volume of extract injected (μL)
V_s	=	Sample volume (mL)

Response Factor calculation:

The RF for each specific analyte is quantitated based on the area response from the continuing calibration check as follows:

$$RF = \frac{A_u}{total\ pg\ injected}$$

where

A_u = Area or peak height

and

$$RF_{ave} = \frac{RF_1 + ... + RF_n}{n}$$

where

n = number of samples

Revision 7/11/94

Analytical Procedure for Pesticides/PCBs in Soil

Extraction Procedure

The soil samples were extracted by the Soxhlet method. Thirty grams of sample was spiked with a surrogate solution consisting of tetrachloro-m-xylene and decachlorobiphenyl, 30 g anhydrous sodium sulfate and Soxhlet extracted for 16 hours with 300 mL 1:1 hexane: acetone. The extract was concentrated to 5.0 mL.

Gas Chromatographic Analysis

The extract was analyzed for pesticides and PCBs using simultaneous dual column injections. The analysis was done on an HP 5890 GC/ECD system, equipped with an HP 7673A automatic sampler, and controlled with an HP-CHEM STATION. The following conditions were employed:

First Column	DB-608, 30 meter, 0.53mm fused silica capillary, 0.83 μm film thickness
Injector Temperature	250° C
Detector Temperature	325° C
Temperature Program	150°C for 1 minute 7°C/min to 265°C 18 min at 265°
Second Column	Rtx-1701, 30 meter, 0.53mm fused silica capillary, 0.50 μm film thickness
Injector Temperature	250° C
Detector Temperature	325° C
Temperature Program	150° C for 1 minute 17°C/min to 265°C 18 min at 265°

The gas chromatographs were calibrated using 5 pesticide standards at 20, 50, 100, 200, and 500 μg/L. The results from each mixture were used to calculate the response factor (RF) of each analyte and the average Response Factor was used to calculate the concentration of pesticide in the sample. Quantification was based on the DB-608 column (signal 1) and the identity of the analyte was confirmed using the Rtx-1701 column (signal 2). A fingerprint chromatogram was run using each of the seven Aroclor mixtures and toxaphene; calibration curves were run only if a particular Aroclor or toxaphene was found in the sample.

The pesticide/PCB results, listed in Table 1.6, are calculated by using the following formula:

$$C_u = \frac{DF x A_u x V_t}{RF_{ave} x V_i x W x D}$$

where

C_u	=	Concentration of analyte (mg/Kg)
DF	=	Dilution Factor
A_u	=	Area or peak height
V_t	=	Volume of sample (mL)
RF_{ave}	=	Average response factor
V_i	=	Volume of extract injected (μL)
W	=	Weight of sample (g)
D	=	Decimal per cent solids

Response Factor calculation:

The RF for each specific analyte is quantitated based on the area response from the continuing calibration check as follows:

$$RF = \frac{A_u}{total\ pg\ injected}$$

where

A_u = Area or peak height

and

$$RF_{ave} = \frac{RF_1 + \ldots + RF_n}{n}$$

where

n = number of samples

Revision 7/11/94

Analytical Procedure for Pesticides/PCBs in Tissue

Extraction Procedure

The entire sample was homogenized with dry ice using a variable speed laboratory blender. After homogenization was completed, the contents of the blender, (tissue and dry ice) were quantitatively transferred to clean jars and the dry ice was allowed to sublime overnight in a freezer at -10° C. Homogenization of animal mass greater than 20 grams was carried out in several steps.

Gas Chromatographic Analysis

The extract was analyzed for pesticides and PCBs using simultaneous dual column injections. A surrogate mixture consisting of tetrachloro-m-xylene and decachlorobiphenyl was added. The analysis was done on an HP 5890 GC/ECD system, equipped with an HP 7673A automatic sampler, and controlled with an HP-CHEM STATION. The following conditions were employed:

First Column	DB-608, 30 meter, 0.53mm fused silica capillary, 0.83μm film thickness
Injector Temperature	250° C
Detector Temperature	325° C
Temperature Program	150°C for 1 minute 7°C/min to 265°C 18 min at 265°
Second Column	RTx-1701, 30 meter, 0.53mm fused silica capillary, 0.50μm film thickness
Injector Temperature	250° C
Detector Temperature	325° C
Temperature Program	150° C for 1 minute 7°C/min to 265°C 18 min at 265°

The gas chromatographs were calibrated using 5 pesticide standards at 20, 50, 100, 200, and 500μg/L. The results from each mixture were used to calculate the response factor (RF) of each analyte and the average Response Factor was used to calculate the concentration of pesticide in the sample. Quantification was based on the DB-608 column (signal 1) and the identity of the analyte was confirmed using the RTx-1701 column (signal 2). A fingerprint chromatogram was run using each of the seven Aroclor mixtures, and toxaphene; calibration curves were run only if a particular Aroclor or toxaphene was found in the sample.

The results, listed in Table 1.7, are calculated by using the following formula:

$$C_{\mu g/Kg} = \frac{A \times V_f \times DF}{RF_{ave} \times V \times W_s \times D}$$

where

A	= Area or Peak Height
V_f	= Volume of Extract (mL)
DF	= Dilution Factor
RF_{ave}	= Average Response Factor
V	= Volume injected (μL)
W	= Weight of Sample (g)
D	= Decimal percent solids

where

$$RF = \frac{A}{\text{total pg injected}}$$

$$RF_{ave} = \frac{RF_1 + \ldots + RF_n}{n}$$

and

A = Area of Peak
n = number of samples

Revision of 6/30/94

Analytical Procedure for Metals in Water

Sample Preparation

A representative 45 mL aliquot of each sample was mixed with 5.0 mL concentrated nitric acid, placed in an acid rinsed Teflon container, capped with a Teflon lined cap, and digested according to SW-846, Method 3015 in a CEM MDS-2100 microwave oven, which was programmed to bring the samples to 160 +/- 4°C in 10 minutes (first stage) and slowly rise to 165-170°C in the second 10 minutes (second stage). After digestion, samples were allowed to cool to room temperature and were transfered to polyethylene bottles. Samples were analyzed for all metals, except mercury, by US EPA SW-846, Method 7000 Atomic Absorption (AA) or Method 6010 Inductively Coupled Argon Plasma (ICAP) procedures.

A 100 mL aliquot of each sample was transfered to a 300-mL BOD bottle and prepared according to SW-846, Method 7470. The samples were heated for 2 hours on a hot plate at 95 °C, cooled to room temperature, and reduced with Hydroxylamine hydrochloride (NH_2OH:HCl). Mercury was then analyzed separately on a Varian SpectrAA-300 Atomic Absorption Spectrophotometer equipped with a Varian VGA-76 vapor gas analyzer by SW-846, Method 7470.

A reagent blank and a blank spike sample were carried through the sample preparation procedure for each analytical batch of samples processed. One matrix spike (MS) and one matrix spike duplicate (MSD) sample were also processed for each analytical batch or every 10 samples.

Analysis and Calculations

The AA and ICAP instruments were calibrated and operated according to SW-846, Method 7000/7470/6010 and the manufacturer's operating instructions. After calibration, initial calibration verification (ICV), initial calibration blank (ICB), and QC check standards were run to verify proper calibration. The continuing calibration verification (CCV) and continuing calibration blank (CCB) standards were run after every 10 samples to verify proper operation during sample analysis.

The metal concentrations in solution, in micrograms per liter (µg/L) were read directly from the read-out systems of the instruments. ICAP and Mercury results were taken directly from instrument read-outs. The ICAP results were corrected for digestion volume (45 mL sample + 5 mL nitric acid) prior to instrument read-out; AA read-outs (excluding Mercury) were externally corrected for digestion volume (1.1111 * AA read-out).

For samples that required dilution to fall within the instrument calibration range:

$$\mu g/L \text{ metal in sample} = A\,[\,(C+B)\,/\,C\,]$$

where:

- A = direct read-out (ICAP and Mercury)
- A = corrected read-out (AA)
- B = acid blank matrix used for dilution, mL
- C = sample aliquot, mL

Results of the analyses are listed in Table 1.8.

Analytical Procedure for Metals in Soil

Sample Preparation

A representative 1-2 g (wet weight) sample, weighed to 0.01 g accuracy, was mixed with 10 ml 1:1 nitric acid, placed in a clean beaker and digested in nitric acid and hydrogen peroxide according to SW-846, Method 3050. The final reflux was either nitric acid or hydrochloric acid depending on the metals to be determined. After digestion , the samples were allowed to cool to room temperature and transferred to polyethylene bottles. The samples were analyzed for all metals, except mercury, by USEPA SW-846, Method 7000 (Atomic absorption) or Method 6010 (Inductively Coupled Argon Plasma-ICAP) procedures.

A representative 0.5-0.6 g (wet weight) sample, weighed to 0.01 g accuracy, was prepared and analyzed separately for mercury on a Varian SpectrAA-300 Atomic Absorption Spectrophotometer equipped with a Varian VGA-76 vapor gas analyzer according to SW-846, Method 7471.

A separate sample was used to determine total solids.

A reagent blank and a blank spike sample were carried through the sample preparation procedure for each batch of samples processed. One matrix spike (MS) and one matrix spike duplicate (MSD) were analyzed for each batch or for every ten samples.

Analysis and Calculations

The instruments were calibrated and operated according to SW-846, Method 7000/7471/6010 and the manufacturers operating instructions. After calibration, initial calibration verification (ICV), initial calibration blank (ICB) and quality control check standards were run to verify proper calibration. The continuing calibration verification (CCV) and continuing calibration blank (CCB) were run after every ten samples to assure proper operation during sample analysis.

The metal concentrations in solution , in micrograms per liter (μg/L) were taken from the read-out systems of the Atomic Absorption instuments. The results were converted to milligrams per kilogram (mg/kg) by correcting the reading for the sample weight and percent solids. The ICAP results (mg/kg) were corrected for sample weight prior to instrument read-out; the instrument read-out was then corrected for percent solids.

Final concentrations, based on wet weight are given by:

mg metal/kg sample = [(AxV)/W]xDFxCF

where:

A = Insrument read-out (μg/L, AA; mg/kg,ICAP)
V = final volume of processed sample (mL,AA; 1.00 ICAP)
W = weight of sample (g,AA; 1.00 ICAP)
DF = Dilution Factor (1.00 for no dilution)
CF = conversion factor (0.001, AA; 1.00, ICAP)

For samples that required dilution to be within the instrument calibration range, DF is given by:

$$DF = (C+B)/C$$

where:

B = acid blank matrix used for dilution (mL)
C = sample blank aliquot (mL)

Final concentrations, based on dry weight, are given by:

$$mg/kg(dry) = [mg/kg\ (wet) x100]\ /S$$

where

S = percent solids

The results are listed in Tables 1.9 and 1.11.

Analytical Procedure for Metals in Tissue

Sample Preparation

A representative 0.5-1.5 g (wet weight) sample, weighed to 0.01 g accuracy, was thoroughly mixed with 10 ml 1:1 nitric acid, placed in an acid rinsed Teflon container and heated on a hot plate for 60-90 min at 60-65° C. The container was capped with a Teflon lined cap and digested on a CEM MDS-2100 microwave oven which was programmed in different stages. After digestion , the samples were allowed to cool to room temperature, transferred to 50 mL volumetric flasks and diluted to 50 mL with ASTM type II water. The samples were analyzed for all metals, except mercury, by USEPA SW-846, Method 7000 (Atomic absorption) or Method 6010 (Inductively Coupled Argon Plasma-ICAP) procedures.

A representative 0.5-0.6 g (wet weight) sample aliquot, weighed to 0.01 g accuracy, was prepared and analyzed separately for mercury on a Varian SpectrAA-300 Atomic Absorption Spectrophotometer equipped with a Varian VGA-76 vapor gas analyzer according to SW-846, Method 7471.

A separate sample was used to determine total solids. A reagent blank and a blank spike sample were carried through the sample preparation procedure for each batch of samples processed. One matrix spike (MS) and one matrix spike duplicate (MSD) were analyzed for each batch or for every ten samples.

Analysis and Calculations

The AA and ICAP instruments were calibrated and operated according to SW-846, Method 7000/7471/6010 and the manufacturers operating instructions. After calibration, initial calibration verification (ICV), initial calibration blank (ICB) and quality control check standards were run to verify proper calibration. The continuing calibration verification (CCV) and continuing calibration blank (CCB) were run after every ten samples to verify proper operation during sample analysis.

The metal concentrations in solution , in micrograms per liter (μg/L) were taken from the read-out systems of the Atomic Absorption instuments. AA results in milligrams per kilogram (mg/kg) were obtained by externally correcting the reading for the sample weight and percent solids. The ICAP results (mg/kg) were corrected for sample weight prior to instrument read-out; the instrument read-out was then corrected for percent solids.

Final concentrations, based on wet weight are given by:

$$\text{mg metal/kg sample} = [(A \times V)/W] \times DF \times CF$$

where:

A = Insrument read-out (µg/L, AA; mg/kg, ICAP)
V = final volume of processed sample (mL,AA)
W = weight of sample (g,AA)
V,W = 1.00 (ICAP)
DF = Dilution Factor (1.00 for no dilution)
CF = conversion factor (0.001, AA; 1.00, ICAP)

For samples that required dilution to be within the instrument calibration range, DF is given by:

$$DF = (C+B)/C$$

where:

B = acid blank matrix used for dilution (mL)
C = sample blank aliquot (mL)

Final concentrations, based on dry weight, are given by:

$$\text{mg/kg(dry)} = [\text{mg/kg (wet)} \times 100] / S$$

where

S = percent solids

The results are listed in Table 1.10.

Table 1.1 Results of the Analysis for VOC in Water
WA # 2-215 Avtex Fibers

Sample #	VBLK1		11-215-00046		11-215-00047		C 11-215-00410		11-215-00411	
Location			Sulfate Basin No 5		Fly Ash Basin No 4		Reference		BMI-1	
Collected			5/12/97		5/12/97		5/14/97		5/14/97	
Analyzed	5/20/97		5/20/97		5/20/97		5/20/97		5/20/97	
File Name	K18599.D		K18605.D		K18619.D		K18607.D		K18608.D	
Dil. Factor	1		1		1		1		1	
Compound	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L
Chloromethane	U	1	U	1	U	1	U	1	U	1
Bromomethane	U	1	U	1	U	1	U	1	U	1
Vinyl chloride	U	1	U	1	U	1	U	1	U	1
Chloroethane	U	1	U	1	U	1	U	1	U	1
Methylene chloride	U	1	U	1	U	1	U	1	U	1
Acetone	U	5	U	5	U	5	U	5	1 J	5
Carbon Disulfide	U	1	U	1	U	1	U	1	U	1
1,1-Dichloroethene	U	1	U	1	U	1	U	1	U	1
1,1-Dichloroethane	U	1	U	1	U	1	U	1	U	1
Chloroform	U	1	U	1	U	1	U	1	U	1
1,2-Dichloroethane	U	1	U	1	U	1	U	1	U	1
2-Butanone	U	5	U	5	U	5	U	5	U	5
1,1,1,-Trichloroethane	U	1	U	1	U	1	U	1	U	1
Carbon tetrachloride	U	1	U	1	U	1	U	1	U	1
Bromodichloromethane	U	1	U	1	U	1	U	1	U	1
1,2-Dichloropropane	U	1	U	1	U	1	U	1	U	1
cis-1,3-Dichloropropene	U	1	U	1	U	1	U	1	U	1
Trichloroethene	U	1	U	1	U	1	U	1	U	1
Dibromochloromethane	U	1	U	1	U	1	U	1	U	1
1,1,2-Trichloroethane	U	1	U	1	U	1	U	1	U	1
Benzene	U	1	U	1	U	1	U	1	U	1
trans-1,3-Dichloropropene	U	1	U	1	U	1	U	1	U	1
Bromoform	U	1	U	1	U	1	U	1	U	1
4-Methyl-2-Pentanone	U	5	U	5	U	5	U	5	U	5
2-Hexanone	U	5	U	5	U	5	U	5	U	5
Tetrachloroethene	U	1	U	1	U	1	U	1	U	1
Toluene	U	1	U	1	U	1	U	1	U	1
1,1,2,2-Tetrachloroethane	U	1	U	1	U	1	U	1	U	1
Chlorobenzene	U	1	U	1	U	1	U	1	U	1
Ethyl benzene	U	1	U	1	U	1	U	1	U	1
Styrene	U	1	U	1	U	1	U	1	U	1
m,p Xylenes	U	1	U	1	U	1	U	1	U	1
o Xylene	U	1	U	1	U	1	U	1	U	1
1,2-Dibromoethane	U	1	U	1	U	1	U	1	U	1
1,1,1,2-Tetrachloroethane	U	1	U	1	U	1	U	1	U	1
1,2,3-Trichloropropane	U	1	U	1	U	1	U	1	U	1
Dichlorodifluoromethane	U	1	U	1	U	1	U	1	U	1
Trichlorofluoromethane	U	1	U	1	U	1	U	1	U	1
Dibromomethane	U	1	U	1	U	1	U	1	U	1
1,2-Dibromo-3-chloropropane	U	1	U	1	U	1	U	1	U	1
Bromobenzene	U	1	U	1	U	1	U	1	U	1
n-Butylbenzene	U	1	U	1	U	1	U	1	U	1
tert-Butylbenzene	U	1	U	1	U	1	U	1	U	1
sec-Butylbenzene	U	1	U	1	U	1	U	1	U	1
2-Chlorotoluene	U	1	U	1	U	1	U	1	U	1
4-Chlorotoluene	U	1	U	1	U	1	U	1	U	1
1,2-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,3-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,4-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,3-Dichloropropane	U	1	U	1	U	1	U	1	U	1
2,2-Dichloropropane	U	1	U	1	U	1	U	1	U	1
1,1-Dichloropropene	U	1	U	1	U	1	U	1	U	1
Hexachlorobutadiene	U	1	U	1	U	1	U	1	U	1
Isopropylbenzene	U	1	U	1	U	1	U	1	U	1
p-Isopropyltoluene	U	1	U	1	U	1	U	1	U	1
Naphthalene	U	1	U	1	U	1	U	1	U	1
n-Propylbenzene	U	1	U	1	U	1	U	1	U	1
1,2,3-Trichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,2,4-Trichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,2,4-Trimethylbenzene	U	1	U	1	U	1	U	1	U	1
1,3,5-Trimethylbenzene	U	1	U	1	U	1	U	1	U	1
Methyl-tert-Butyl Ether	U	1	U	1	U	1	U	1	U	1
1,2-Dichloroethene (total)	U	1	U	1	U	1	U	1	U	1
Bromochloromethane	U	1	U	1	U	1	U	1	U	1

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Table 1.1 (Cont) Results of the Analysis for VOC in Water
WA # 2-215 Avtex Fibers

Sample #	11-215-00412		11-215-00413		11-215-00415		11-215-00417		11-215-00418	
Location	BMI-2		BMI-3		Outfall 005		Trip Blank		Field Blank	
Collected	5/14/97		5/14/97		5/14/97		5/14/97		5/14/97	
Analyzed	5/20/97		5/20/97		5/20/97		5/20/97		5/20/97	
File Name	K18609.D		K18610.D		K18611.D		K18612.D		K18613.D	
Dil. Factor	1		1		1		1		1	
Compound	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L
Chloromethane	U	1	U	1	U	1	U	1	U	1
Bromomethane	U	1	U	1	U	1	U	1	U	1
Vinyl chloride	U	1	U	1	U	1	U	1	U	1
Chloroethane	U	1	U	1	U	1	U	1	U	1
Methylene chloride	U	1	U	1	U	1	U	1	U	1
Acetone	1 J	5	U	5	U	5	7	5	2 J	5
Carbon Disulfide	U	1	U	1	U	1	U	1	U	1
1,1-Dichloroethene	U	1	U	1	U	1	U	1	U	1
1,1-Dichloroethane	U	1	U	1	U	1	U	1	U	1
Chloroform	U	1	U	1	U	1	U	1	4	1
1,2-Dichloroethane	U	1	U	1	U	1	U	1	U	1
2-Butanone	U	5	U	5	U	5	U	5	U	5
1,1,1,-Trichloroethane	U	1	U	1	U	1	U	1	U	1
Carbon tetrachloride	U	1	U	1	U	1	U	1	U	1
Bromodichloromethane	U	1	U	1	U	1	U	1	2	1
1,2-Dichloropropane	U	1	U	1	U	1	U	1	U	1
cis-1,3-Dichloropropene	U	1	U	1	U	1	U	1	U	1
Trichloroethene	U	1	U	1	U	1	U	1	U	1
Dibromochloromethane	U	1	U	1	U	1	U	1	0.7 J	1
1,1,2-Trichloroethane	U	1	U	1	U	1	U	1	U	1
Benzene	U	1	U	1	U	1	U	1	U	1
trans-1,3-Dichloropropene	U	1	U	1	U	1	U	1	U	1
Bromoform	U	1	U	1	U	1	U	1	U	1
4-Methyl-2-Pentanone	U	5	U	5	U	5	U	5	U	5
2-Hexanone	U	5	U	5	U	5	U	5	U	5
Tetrachloroethene	U	1	U	1	U	1	U	1	U	1
Toluene	U	1	U	1	U	1	U	1	U	1
1,1,2,2-Tetrachloroethane	U	1	U	1	U	1	U	1	U	1
Chlorobenzene	U	1	U	1	U	1	U	1	U	1
Ethyl benzene	U	1	U	1	U	1	U	1	U	[illegible]
Styrene	U	1	U	1	U	1	U	1	U	1
m,p Xylenes	U	1	U	1	U	1	U	1	U	1
o Xylene	U	1	U	1	U	1	U	1	U	1
1,2-Dibromoethane	U	1	U	1	U	1	U	1	U	1
1,1,1,2-Tetrachloroethane	U	1	U	1	U	1	U	1	U	1
1,2,3-Trichloropropane	U	1	U	1	U	1	U	1	U	1
Dichlorodifluoromethane	U	1	U	1	U	1	U	1	U	1
Trichlorofluoromethane	U	1	U	1	U	1	U	1	U	1
Dibromomethane	U	1	U	1	U	1	U	1	U	1
1,2-Dibromo-3-chloropropane	U	1	U	1	U	1	U	1	U	1
Bromobenzene	U	1	U	1	U	1	U	1	U	1
n-Butylbenzene	U	1	U	1	U	1	U	1	U	1
tert-Butylbenzene	U	1	U	1	U	1	U	1	U	1
sec-Butylbenzene	U	1	U	1	U	1	U	1	U	1
2-Chlorotoluene	U	1	U	1	U	1	U	1	U	1
4-Chlorotoluene	U	1	U	1	U	1	U	1	U	1
1,2-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,3-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,4-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,3-Dichloropropane	U	1	U	1	U	1	U	1	U	1
2,2-Dichloropropane	U	1	U	1	U	1	U	1	U	1
1,1-Dichloropropene	U	1	U	1	U	1	U	1	U	1
Hexachlorobutadiene	U	1	U	1	U	1	U	1	U	1
Isopropylbenzene	U	1	U	1	U	1	U	1	U	1
p-Isopropyltoluene	U	1	U	1	U	1	U	1	U	1
Naphthalene	U	1	U	1	U	1	U	1	U	1
n-Propylbenzene	U	1	U	1	U	1	U	1	U	1
1,2,3-Trichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,2,4-Trichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,2,4-Trimethylbenzene	U	1	U	1	U	1	U	1	U	1
1,3,5-Trimethylbenzene	U	1	U	1	U	1	U	1	U	1
Methyl-tert-Butyl Ether	U	1	U	1	U	1	U	1	U	1
1,2-Dichloroethene (total)	U	1	U	1	U	1	U	1	U	1
Bromochloromethane	U	1	U	1	U	1	U	1	U	1

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Table 1.1 (Cont) Results of the Analysis for VOC in Water
WA # 2-215 Avtex Fibers

Sample #	11-215-00419		11-215-00601		11-215-00602		11-215-00603		11-215-00604	
Location	Reference No 2		Sulfate Basin No 1		Emergency Pond		Polish Pond		Outfall 004	
Collected	5/15/97		5/14/97		5/14/97		5/14/97		5/14/97	
Analyzed	5/20/97		5/20/97		5/20/97		5/20/97		5/20/97	
File Name	K18614.D		K18615.D		K18616.D		K18617.D		K18618.D	
Dil. Factor	1		1		1		1		1	
Compound	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L
Chloromethane	U	1	U	1	U	1	U	1	U	1
Bromomethane	U	1	U	1	U	1	U	1	U	1
Vinyl chloride	U	1	U	1	U	1	U	1	U	1
Chloroethane	U	1	U	1	U	1	U	1	U	1
Methylene chloride	U	1	U	1	U	1	U	1	U	1
Acetone	U	5	U	5	U	5	U	5	U	5
Carbon Disulfide	U	1	U	1	U	1	U	1	U	1
1,1-Dichloroethene	U	1	U	1	U	1	U	1	U	1
1,1-Dichloroethane	U	1	U	1	U	1	U	1	U	1
Chloroform	U	1	U	1	U	1	U	1	U	1
1,2-Dichloroethane	U	1	U	1	U	1	U	1	U	1
2-Butanone	U	5	U	5	U	5	U	5	U	5
1,1,1,-Trichloroethane	U	1	U	1	U	1	U	1	U	1
Carbon tetrachloride	U	1	U	1	U	1	U	1	U	1
Bromodichloromethane	U	1	U	1	U	1	U	1	U	1
1,2-Dichloropropane	U	1	U	1	U	1	U	1	U	1
cis-1,3-Dichloropropene	U	1	U	1	U	1	U	1	U	1
Trichloroethene	U	1	U	1	U	1	U	1	U	1
Dibromochloromethane	U	1	U	1	U	1	U	1	U	1
1,1,2-Trichloroethane	U	1	U	1	U	1	U	1	U	1
Benzene	U	1	U	1	U	1	U	1	U	1
trans-1,3-Dichloropropene	U	1	U	1	U	1	U	1	U	1
Bromoform	U	1	U	1	U	1	U	1	U	1
4-Methyl-2-Pentanone	U	5	U	5	U	5	U	5	U	5
2-Hexanone	U	5	U	5	U	5	U	5	U	5
Tetrachloroethene	U	1	U	1	U	1	U	1	U	1
Toluene	U	1	U	1	U	1	U	1	U	1
1,1,2,2-Tetrachloroethane	U	1	U	1	U	1	U	1	U	1
Chlorobenzene	U	1	U	1	U	1	U	1	U	1
Ethyl benzene	U	1	U	1	U	1	U	1	U	1
Styrene	U	1	U	1	U	1	U	1	U	1
m,p Xylenes	U	1	U	1	U	1	U	1	U	1
o Xylene	U	1	U	1	U	1	U	1	U	1
1,2-Dibromoethane	U	1	U	1	U	1	U	1	U	1
1,1,1,2-Tetrachloroethane	U	1	U	1	U	1	U	1	U	1
1,2,3-Trichloropropane	U	1	U	1	U	1	U	1	U	1
Dichlorodifluoromethane	U	1	U	1	U	1	U	1	U	1
Trichlorofluoromethane	U	1	U	1	U	1	U	1	U	1
Dibromomethane	U	1	U	1	U	1	U	1	U	1
1,2-Dibromo-3-chloropropane	U	1	U	1	U	1	U	1	U	1
Bromobenzene	U	1	U	1	U	1	U	1	U	1
n-Butylbenzene	U	1	U	1	U	1	U	1	U	1
tert-Butylbenzene	U	1	U	1	U	1	U	1	U	1
sec-Butylbenzene	U	1	U	1	U	1	U	1	U	1
2-Chlorotoluene	U	1	U	1	U	1	U	1	U	1
4-Chlorotoluene	U	1	U	1	U	1	U	1	U	1
1,2-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,3-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,4-Dichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,3-Dichloropropane	U	1	U	1	U	1	U	1	U	1
2,2-Dichloropropane	U	1	U	1	U	1	U	1	U	1
1,1-Dichloropropene	U	1	U	1	U	1	U	1	U	1
Hexachlorobutadiene	U	1	U	1	U	1	U	1	U	1
Isopropylbenzene	U	1	U	1	U	1	U	1	U	1
p-Isopropyltoluene	U	1	U	1	U	1	U	1	U	1
Naphthalene	U	1	U	1	U	1	U	1	U	1
n-Propylbenzene	U	1	U	1	U	1	U	1	U	1
1,2,3-Trichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,2,4-Trichlorobenzene	U	1	U	1	U	1	U	1	U	1
1,2,4-Trimethylbenzene	U	1	U	1	U	1	U	1	U	1
1,3,5-Trimethylbenzene	U	1	U	1	U	1	U	1	U	1
Methyl-tert-Butyl Ether	U	1	U	1	U	1	U	1	U	1
1,2-Dichloroethene (total)	U	1	U	1	U	1	U	1	U	1
Bromochloromethane	U	1	U	1	U	1	U	1	U	1

[redacted]

Table 1.1 (Cont) Results of the Analysis for VOC in Water
WA # 2-215 Avtex Fibers

Sample #	11-215-00414
Location	Outfall 004
Collected	5/14/97
Analyzed	5/20/97
File Name	K18604.D
Dil. Factor	1

Compound	Conc µg/L		MDL µg/L
Chloromethane	U		1
Bromomethane	U		1
Vinyl chloride	U		1
Chloroethane	U		1
Methylene chloride	U		1
Acetone	2	J	5
Carbon Disulfide	U		1
1,1-Dichloroethene	U		1
1,1-Dichloroethane	U		1
Chloroform	U		1
1,2-Dichloroethane	U		1
2-Butanone	U		5
1,1,1,-Trichloroethane	U		1
Carbon tetrachloride	U		1
Bromodichloromethane	U		1
1,2-Dichloropropane	U		1
cis-1,3-Dichloropropene	U		1
Trichloroethene	U		1
Dibromochloromethane	U		1
1,1,2-Trichloroethane	U		1
Benzene	U		1
trans-1,3-Dichloropropene	U		1
Bromoform	U		1
4-Methyl-2-Pentanone	U		5
2-Hexanone	U		5
Tetrachloroethene	U		1
Toluene	U		1
1,1,2,2-Tetrachloroethane	U		1
Chlorobenzene	U		1
Ethyl benzene	U		1
Styrene	U		1
m,p Xylenes	U		1
o Xylene	U		1
1,2-Dibromoethane	U		1
1,1,1,2-Tetrachloroethane	U		1
1,2,3-Trichloropropane	U		1
Dichlorodifluoromethane	U		1
Trichlorofluoromethane	U		1
Dibromomethane	U		1
1,2-Dibromo-3-chloropropane	U		1
Bromobenzene	U		1
n-Butylbenzene	U		1
tert-Butylbenzene	U		1
sec-Butylbenzene	U		1
2-Chlorotoluene	U		1
4-Chlorotoluene	U		1
1,2-Dichlorobenzene	U		1
1,3-Dichlorobenzene	U		1
1,4-Dichlorobenzene	U		1
1,3-Dichloropropane	U		1
2,2-Dichloropropane	U		1
1,1-Dichloropropene	U		1
Hexachlorobutadiene	U		1
Isopropylbenzene	U		1
p-Isopropyltoluene	U		1
Naphthalene	U		1
n-Propylbenzene	U		1
1,2,3-Trichlorobenzene	U		1
1,2,4-Trichlorobenzene	U		1
1,2,4-Trimethylbenzene	U		1
1,3,5-Trimethylbenzene	U		1
Methyl-tert-Butyl Ether	U		1
1,2-Dichloroethene (total)	U		1
Bromochloromethane	U		1

[redacted]

Table 1.2 Results of the Analysis for VOC in Soil
WA # 2-215 Avtex Fibers
Based on dry Weight

Sample #	VBLK1		11-215-00402		11-215-00408		11-215-00409		11-215-00502	
Location			BMI-2		Field Blank		Trip Blank		Wetland Area	
% Solids	100		42		100		100		78	
Collected			5/13/97		5/14/97		5/14/97		5/15/97	
Analyzed	5/21/97		5/21/97		5/21/97		5/21/97		5/21/97	
File Name	K18648.D		K18654.D		K18660.D		K18661.D		K18666.D	
Dil. Factor	1		1		1		1		1	
Compound	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
Chloromethane	U	5	U	12	U	5	U	5	U	6
Bromomethane	U	5	U	12	U	5	U	5	U	6
Vinyl chloride	U	5	U	12	U	5	U	5	U	6
Chloroethane	U	5	U	12	U	5	U	5	U	6
Methylene chloride	U	5	U	12	U	5	U	5	U	6
Acetone	U	5	42	12	U	5	U	5	U	6
Carbon Disulfide	U	5	U	12	U	5	U	5	U	6
1,1-Dichloroethene	U	5	U	12	U	5	U	5	U	6
1,1-Dichloroethane	U	5	U	12	U	5	U	5	U	6
Chloroform	U	5	U	12	U	5	U	5	U	6
1,2-Dichloroethane	U	5	U	12	U	5	U	5	U	6
2-Butanone	U	5	U	12	U	5	U	5	U	6
1,1,1,-Trichloroethane	U	5	U	12	U	5	U	5	U	6
Carbon tetrachloride	U	5	U	12	U	5	U	5	U	6
Bromodichloromethane	U	5	U	12	U	5	U	5	U	6
1,2-Dichloropropane	U	5	U	12	U	5	U	5	U	6
cis-1,3-Dichloropropene	U	5	U	12	U	5	U	5	U	6
Trichloroethene	U	5	U	12	U	5	U	5	U	6
Dibromochloromethane	U	5	U	12	U	5	U	5	U	6
1,1,2-Trichloroethane	U	5	U	12	U	5	U	5	U	6
Benzene	U	5	U	12	U	5	U	5	U	6
trans-1,3-Dichloropropene	U	5	U	12	U	5	U	5	U	6
Bromoform	U	5	U	12	U	5	U	5	U	6
4-Methyl-2-Pentanone	U	5	U	12	U	5	U	5	U	6
2-Hexanone	U	5	U	12	U	5	U	5	U	6
Tetrachloroethene	U	5	U	12	U	5	U	5	U	6
Toluene	U	5	U	12	U	5	U	5	U	6
1,1,2,2-Tetrachloroethane	U	5	U	12	U	5	U	5	U	6
Chlorobenzene	U	5	U	12	U	5	U	5	U	6
Ethyl benzene	U	5	U	12	U	5	U	5	U	6
Styrene	U	5	U	12	U	5	U	5	U	6
m,p Xylenes	U	5	U	12	U	5	U	5	U	6
o Xylene	U	5	U	12	U	5	U	5	U	6
1,2-Dibromoethane	U	5	U	12	U	5	U	5	U	6
1,1,1,2-Tetrachloroethane	U	5	U	12	U	5	U	5	U	6
1,2,3-Trichloropropane	U	5	U	12	U	5	U	5	U	6
Dichlorodifluoromethane	U	5	U	12	U	5	U	5	U	6
Trichlorofluoromethane	U	5	U	12	U	5	U	5	U	6
Dibromomethane	U	5	U	12	U	5	U	5	U	6
1,2-Dibromo-3-chloropropane	U	5	U	12	U	5	U	5	U	6
Bromobenzene	U	5	U	12	U	5	U	5	U	6
n-Butylbenzene	U	5	U	12	U	5	U	5	U	6
tert-Butylbenzene	U	5	U	12	U	5	U	5	U	6
sec-Butylbenzene	U	5	U	12	U	5	U	5	U	6
2-Chlorotoluene	U	5	U	12	U	5	U	5	U	6
4-Chlorotoluene	U	5	U	12	U	5	U	5	U	6
1,2-Dichlorobenzene	U	5	U	12	U	5	U	5	U	6
1,3-Dichlorobenzene	U	5	U	12	U	5	U	5	U	6
1,4-Dichlorobenzene	U	5	U	12	U	5	U	5	U	6
1,3-Dichloropropane	U	5	U	12	U	5	U	5	U	6
2,2-Dichloropropane	U	5	U	12	U	5	U	5	U	6
1,1-Dichloropropene	U	5	U	12	U	5	U	5	U	6
Hexachlorobutadiene	U	5	U	12	U	5	U	5	U	6
Isopropylbenzene	U	5	U	12	U	5	U	5	U	6
p-Isopropyltoluene	U	5	U	12	U	5	U	5	U	6
Naphthalene	U	5	U	12	U	5	U	5	U	6
n-Propylbenzene	U	5	U	12	U	5	U	5	U	6
1,2,3-Trichlorobenzene	U	5	U	12	U	5	U	5	U	6
1,2,4-Trichlorobenzene	U	5	U	12	U	5	U	5	U	6
1,2,4-Trimethylbenzene	U	5	U	12	U	5	U	5	U	6
1,3,5-Trimethylbenzene	U	5	U	12	U	5	U	5	U	6
Methyl-tert-Butyl Ether	U	5	U	12	U	5	U	5	U	6

[redacted]

Table 1.2 (Cont) Results of the Analysis for VOC in Soil
WA # 2-215 Avtex Fibers
Based on dry Weight

Sample #	11-215-00503		11-215-00407	
Location	Emergency Pond		BMI-1	
% Solids	74		48	
Collected	5/15/97		5/13/97	
Analyzed	5/21/97		5/21/97	
File Name	K18667.D		K18659.D	
Dil. Factor	1		1	
Compound	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
Chloromethane	U	7	U	10
Bromomethane	U	7	U	10
Vinyl chloride	U	7	U	10
Chloroethane	U	7	U	10
Methylene chloride	U	7	U	10
Acetone	U	7	64	10
Carbon Disulfide	U	7	U	10
1,1-Dichloroethene	U	7	U	10
1,1-Dichloroethane	U	7	U	10
Chloroform	U	7	U	10
1,2-Dichloroethane	U	7	U	10
2-Butanone	U	7	U	10
1,1,1,-Trichloroethane	U	7	U	10
Carbon tetrachloride	U	7	U	10
Bromodichloromethane	U	7	U	10
1,2-Dichloropropane	U	7	U	10
cis-1,3-Dichloropropene	U	7	U	10
Trichloroethene	U	7	U	10
Dibromochloromethane	U	7	U	10
1,1,2-Trichloroethane	U	7	U	10
Benzene	U	7	U	10
trans-1,3-Dichloropropene	U	7	U	10
Bromoform	U	7	U	10
4-Methyl-2-Pentanone	U	7	U	10
2-Hexanone	U	7	U	10
Tetrachloroethene	U	7	U	10
Toluene	U	7	U	10
1,1,2,2-Tetrachloroethane	U	7	U	10
Chlorobenzene	U	7	U	10
Ethyl benzene	U	7	U	10
Styrene	U	7	U	10
m,p Xylenes	U	7	U	10
o Xylene	U	7	U	10
1,2-Dibromoethane	U	7	U	10
1,1,1,2-Tetrachloroethane	U	7	U	10
1,2,3-Trichloropropane	U	7	U	10
Dichlorodifluoromethane	U	7	U	10
Trichlorofluoromethane	U	7	U	10
Dibromomethane	U	7	U	10
1,2-Dibromo-3-chloropropane	U	7	U	10
Bromobenzene	U	7	U	10
n-Butylbenzene	U	7	U	10
tert-Butylbenzene	U	7	U	10
sec-Butylbenzene	U	7	U	10
2-Chlorotoluene	U	7	U	10
4-Chlorotoluene	U	7	U	10
1,2-Dichlorobenzene	U	7	U	10
1,3-Dichlorobenzene	U	7	U	10
1,4-Dichlorobenzene	U	7	U	10
1,3-Dichloropropane	U	7	U	10
2,2-Dichloropropane	U	7	U	10
1,1-Dichloropropene	U	7	U	10
Hexachlorobutadiene	U	7	U	10
Isopropylbenzene	U	7	U	10
p-Isopropyltoluene	U	7	U	10
Naphthalene	U	7	U	10
n-Propylbenzene	U	7	U	10
1,2,3-Trichlorobenzene	U	7	U	10
1,2,4-Trichlorobenzene	U	7	U	10
1,2,4-Trimethylbenzene	U	7	U	10
1,3,5-Trimethylbenzene	U	7	U	10
Methyl-tert-Butyl Ether	U	7	U	10

Table 1.2 (Cont) Results of the Analysis for VOC in Soil
WA # 2-215 Avtex Fibers
Based on dry Weight

Sample #	VBLK2	11-215-00405	11-215-00406	D 11-215-00410	11-215-00504
Location		BMI-5	BM1-6	Reference No 2	PCB Area
% Solids	100	65	64	64	78
Collected		5/13/97	5/13/97	5/15/97	5/15/97
Analyzed	5/22/97	5/22/97	5/22/97	5/22/97	5/22/97
File Name	K18674.D	K18685.D	K18686.D	K18688.D	K18689.D
Dil. Factor	1	1	1	1	1

Compound	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
Chloromethane	U	5	U	8	U	8	U	8	U	6
Bromomethane	U	5	U	8	U	8	U	8	U	6
Vinyl chloride	U	5	U	8	U	8	U	8	U	6
Chloroethane	U	5	U	8	U	8	U	8	U	6
Methylene chloride	U	5	4 J	8	5 J	8	U	8	4 J	6
Acetone	U	5	28	8	60	8	U	8	U	6
Carbon Disulfide	U	5	U	8	U	8	U	8	U	6
1,1-Dichloroethene	U	5	U	8	U	8	U	8	U	6
1,1-Dichloroethane	U	5	U	8	U	8	U	8	U	6
Chloroform	U	5	U	8	U	8	U	8	U	6
1,2-Dichloroethane	U	5	U	8	U	8	U	8	U	6
2-Butanone	U	5	U	8	13	8	U	8	U	6
1,1,1,-Trichloroethane	U	5	U	8	U	8	U	8	U	6
Carbon tetrachloride	U	5	U	8	U	8	U	8	U	6
Bromodichloromethane	U	5	U	8	U	8	U	8	U	6
1,2-Dichloropropane	U	5	U	8	U	8	U	8	U	6
cis-1,3-Dichloropropene	U	5	U	8	U	8	U	8	U	6
Trichloroethene	U	5	U	8	U	8	U	8	U	6
Dibromochloromethane	U	5	U	8	U	8	U	8	U	6
1,1,2-Trichloroethane	U	5	U	8	U	8	U	8	U	6
Benzene	U	5	U	8	U	8	U	8	U	6
trans-1,3-Dichloropropene	U	5	U	8	U	8	U	8	U	6
Bromoform	U	5	U	8	U	8	U	8	U	6
4-Methyl-2-Pentanone	U	5	U	8	U	8	U	8	U	6
2-Hexanone	U	5	U	8	U	8	U	8	U	6
Tetrachloroethene	U	5	U	8	U	8	U	8	U	6
Toluene	U	5	U	8	U	8	U	8	U	6
1,1,2,2-Tetrachloroethane	U	5	U	8	U	8	U	8	U	6
Chlorobenzene	U	5	U	8	U	8	U	8	U	6
Ethyl benzene	U	5	U	8	U	8	U	8	U	6
Styrene	U	5	U	8	U	8	U	8	U	6
m,p Xylenes	U	5	U	8	U	8	U	8	U	6
o Xylene	U	5	U	8	U	8	U	8	U	6
1,2-Dibromoethane	U	5	U	8	U	8	U	8	U	6
1,1,1,2-Tetrachloroethane	U	5	U	8	U	8	U	8	U	6
1,2,3-Trichloropropane	U	5	U	8	U	8	U	8	U	6
Dichlorodifluoromethane	U	5	U	8	U	8	U	8	U	6
Trichlorofluoromethane	U	5	U	8	U	8	U	8	U	6
Dibromomethane	U	5	U	8	U	8	U	8	U	6
1,2-Dibromo-3-chloropropane	U	5	U	8	U	8	U	8	U	6
Bromobenzene	U	5	U	8	U	8	U	8	U	6
n-Butylbenzene	U	5	U	8	U	8	U	8	U	6
tert-Butylbenzene	U	5	U	8	U	8	U	8	U	6
sec-Butylbenzene	U	5	U	8	U	8	U	8	U	6
2-Chlorotoluene	U	5	U	8	U	8	U	8	U	6
4-Chlorotoluene	U	5	U	8	U	8	U	8	U	6
1,2-Dichlorobenzene	U	5	U	8	U	8	U	8	U	6
1,3-Dichlorobenzene	U	5	U	8	U	8	U	8	U	6
1,4-Dichlorobenzene	U	5	U	8	U	8	U	8	U	6
1,3-Dichloropropane	U	5	U	8	U	8	U	8	U	6
2,2-Dichloropropane	U	5	U	8	U	8	U	8	U	6
1,1-Dichloropropene	U	5	U	8	U	8	U	8	U	6
Hexachlorobutadiene	U	5	U	8	U	8	U	8	U	6
Isopropylbenzene	U	5	U	8	U	8	U	8	U	6
p-Isopropyltoluene	U	5	U	8	U	8	U	8	U	6
Naphthalene	U	5	U	8	U	8	U	8	U	6
n-Propylbenzene	U	5	U	8	U	8	U	8	U	6
1,2,3-Trichlorobenzene	U	5	U	8	U	8	U	8	U	6
1,2,4-Trichlorobenzene	U	5	U	8	U	8	U	8	U	6
1,2,4-Trimethylbenzene	U	5	U	8	U	8	U	8	U	6
1,3,5-Trimethylbenzene	U	5	U	8	U	8	U	8	U	6
Methyl-tert-Butyl Ether	U	5	U	8	U	8	U	8	U	6

Table 1.2 (Cont) Results of the Analysis for VOC in Soil
WA # 2-215 Avtex Fibers
Based on dry Weight

Sample #	11-215-00505		11-215-00044		11-215-00045		11-215-00401		11-215-00404	
Location	Treatment Pond		Sulfate Basin No 5		Fly Ash Basin No 4		Reference		BMI-4	
% Solids	80		22		27		20		60	
Collected	5/15/97		5/12/97		5/12/97		5/13/97		5/13/97	
Analyzed	5/22/97		5/22/97		5/22/97		5/22/97		5/22/97	
File Name	K18690.D		K18680.D		K18681.D		K18682.D		K18684.D	
Dil. Factor	1		1		1		1		1	
Compound	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
Chloromethane	U	6	U	23	U	18	U	25	U	8
Bromomethane	U	6	U	23	U	18	U	25	U	8
Vinyl chloride	U	6	U	23	U	18	U	25	U	8
Chloroethane	U	6	U	23	U	18	U	25	U	8
Methylene chloride	3 J	6	U	23	U	18	U	25	U	8
Acetone	U	6	120	23	600	18	970	25	21	8
Carbon Disulfide	U	6	10 J	23	U	18	U	25	U	8
1,1-Dichloroethene	U	6	U	23	U	18	U	25	U	8
1,1-Dichloroethane	U	6	U	23	U	18	U	25	U	8
Chloroform	U	6	U	23	U	18	U	25	U	8
1,2-Dichloroethane	U	6	U	23	U	18	U	25	U	8
2-Butanone	U	6	36	23	110	18	120	25	U	8
1,1,1,-Trichloroethane	U	6	U	23	U	18	U	25	U	8
Carbon tetrachloride	U	6	U	23	U	18	U	25	U	8
Bromodichloromethane	U	6	U	23	U	18	U	25	U	8
1,2-Dichloropropane	U	6	U	23	U	18	U	25	U	8
cis-1,3-Dichloropropene	U	6	U	23	U	18	U	25	U	8
Trichloroethene	U	6	U	23	U	18	U	25	U	8
Dibromochloromethane	U	6	U	23	U	18	U	25	U	8
1,1,2-Trichloroethane	U	6	U	23	U	18	U	25	U	8
Benzene	U	6	3 J	23	U	18	U	25	U	8
trans-1,3-Dichloropropene	U	6	U	23	U	18	U	25	U	8
Bromoform	U	6	U	23	U	18	U	25	U	8
4-Methyl-2-Pentanone	U	6	U	23	U	18	U	25	U	8
2-Hexanone	U	6	U	23	U	18	U	25	U	8
Tetrachloroethene	U	6	U	23	U	18	U	25	U	[illegible]
Toluene	U	6	3 J	23	U	18	25	25	U	[illegible]
1,1,2,2-Tetrachloroethane	U	6	U	23	U	18	U	25	U	[illegible]
Chlorobenzene	U	6	U	23	U	18	U	25	U	[illegible]
Ethyl benzene	U	6	U	23	U	18	U	25	U	8
Styrene	U	6	U	23	U	18	U	25	U	8
m,p Xylenes	U	6	5 J	23	U	18	U	25	U	8
o Xylene	U	6	U	23	U	18	U	25	U	8
1,2-Dibromoethane	U	6	U	23	U	18	U	25	U	8
1,1,1,2-Tetrachloroethane	U	6	U	23	U	18	U	25	U	8
1,2,3-Trichloropropane	U	6	U	23	U	18	U	25	U	8
Dichlorodifluoromethane	U	6	U	23	U	18	U	25	U	8
Trichlorofluoromethane	U	6	U	23	U	18	U	25	U	8
Dibromomethane	U	6	U	23	U	18	U	25	U	8
1,2-Dibromo-3-chloropropane	U	6	U	23	U	18	U	25	U	8
Bromobenzene	U	8	U	23	U	18	U	25	U	8
n-Butylbenzene	U	6	U	23	U	18	U	25	U	8
tert-Butylbenzene	U	6	U	23	U	18	U	25	U	8
sec-Butylbenzene	U	6	U	23	U	18	U	25	U	8
2-Chlorotoluene	U	6	U	23	U	18	U	25	U	8
4-Chlorotoluene	U	6	U	23	U	18	U	25	U	8
1,2-Dichlorobenzene	U	6	U	23	U	18	U	25	U	8
1,3-Dichlorobenzene	U	6	U	23	U	18	U	25	U	8
1,4-Dichlorobenzene	U	6	U	23	U	18	U	25	U	8
1,3-Dichloropropane	U	6	U	23	U	18	U	25	U	8
2,2-Dichloropropane	U	6	U	23	U	18	U	25	U	8
1,1-Dichloropropene	U	6	U	23	U	18	U	25	U	8
Hexachlorobutadiene	U	6	U	23	U	18	U	25	U	8
Isopropylbenzene	U	6	U	23	U	18	U	25	U	8
p-Isopropyltoluene	U	6	U	23	U	18	U	25	U	8
Naphthalene	U	6	U	23	12 J	18	U	25	U	8
n-Propylbenzene	U	6	U	23	U	18	U	25	U	8
1,2,3-Trichlorobenzene	U	6	U	23	U	18	U	25	U	8
1,2,4-Trichlorobenzene	U	6	U	23	U	18	U	25	U	8
1,2,4-Trimethylbenzene	U	6	0.7 J	23	U	18	U	25	U	8
1,3,5-Trimethylbenzene	U	6	U	23	U	18	U	25	U	8
Methyl-tert-Butyl Ether	U	6	U	23	U	18	U	25	U	[illegible]

[redacted]

Table 1.2 (Cont) Results of the Analysis for VOC in Soil
WA # 2-215 Avtex Fibers
Based on dry Weight

Sample #	11-215-00501		11-215-00607		11-215-00608		11-215-00606	
Location	Reference		Polishing Pond		Viscose Creek		Emergency Pond	
% Solids	84		23		64		24	
Collected	5/15/97		5/14/97		5/14/97		5/14/97	
Analyzed	5/22/97		5/22/97		5/22/97		5/22/97	
File Name	K18679.D		K18693.D		K18694.D		K18694.D	
Dil. Factor	1		1		1		1	
Compound	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
Chloromethane	U	6	U	22	U	8	U	21
Bromomethane	U	6	U	22	U	8	U	21
Vinyl chloride	U	6	U	22	U	8	U	21
Chloroethane	U	6	U	22	U	8	U	21
Methylene chloride	U	6	29	22	7 J	8	U	21
Acetone	U	6	330	22	U	8	250	21
Carbon Disulfide	U	6	U	22	U	8	19 J	21
1,1-Dichloroethene	U	6	U	22	U	8	U	21
1,1-Dichloroethane	U	6	U	22	U	8	U	21
Chloroform	U	6	U	22	U	8	U	21
1,2-Dichloroethane	U	6	U	22	U	8	U	21
2-Butanone	U	6	44	22	U	8	U	21
1,1,1,-Trichloroethane	U	6	U	22	U	8	U	21
Carbon tetrachloride	U	6	U	22	U	8	U	21
Bromodichloromethane	U	6	U	22	U	8	U	21
1,2-Dichloropropane	U	6	U	22	U	8	U	21
cis-1,3-Dichloropropene	U	6	U	22	U	8	U	21
Trichloroethene	U	6	U	22	U	8	U	21
Dibromochloromethane	U	6	U	22	U	8	U	21
1,1,2-Trichloroethane	U	6	U	22	U	8	U	21
Benzene	U	6	U	22	U	8	14 J	21
trans-1,3-Dichloropropene	U	6	U	22	U	8	U	21
Bromoform	U	6	U	22	U	8	U	21
4-Methyl-2-Pentanone	U	6	U	22	U	8	U	21
2-Hexanone	U	6	U	22	U	8	U	21
Tetrachloroethene	U	6	U	22	U	8	U	21
Toluene	U	6	36	22	10	8	99	21
1,1,2,2-Tetrachloroethane	U	6	U	22	U	8	U	21
Chlorobenzene	U	6	U	22	U	8	U	21
Ethyl benzene	U	6	10 J	22	U	8	22	21
Styrene	U	6	U	22	U	8	U	21
m,p Xylenes	U	6	33	22	8	8	70	21
o Xylene	U	6	10 J	22	U	8	14 J	21
1,2-Dibromoethane	U	6	U	22	U	8	U	21
1,1,1,2-Tetrachloroethane	U	6	U	22	U	8	U	21
1,2,3-Trichloropropane	U	6	U	22	U	8	U	21
Dichlorodifluoromethane	U	6	U	22	U	8	U	21
Trichlorofluoromethane	U	6	U	22	U	8	U	21
Dibromomethane	U	6	U	22	U	8	U	21
1,2-Dibromo-3-chloropropane	U	6	U	22	U	8	U	21
Bromobenzene	U	6	U	22	U	8	U	21
n-Butylbenzene	U	6	U	22	U	8	U	21
tert-Butylbenzene	U	6	U	22	U	8	U	21
sec-Butylbenzene	U	6	U	22	U	8	U	21
2-Chlorotoluene	U	6	U	22	U	8	U	21
4-Chlorotoluene	U	6	U	22	U	8	U	21
1,2-Dichlorobenzene	U	6	U	22	U	8	U	21
1,3-Dichlorobenzene	U	6	U	22	U	8	U	21
1,4-Dichlorobenzene	U	6	U	22	U	8	U	21
1,3-Dichloropropane	U	6	U	22	U	8	U	21
2,2-Dichloropropane	U	6	U	22	U	8	U	21
1,1-Dichloropropene	U	6	U	22	U	8	U	21
Hexachlorobutadiene	U	6	U	22	U	8	U	21
Isopropylbenzene	U	6	U	22	U	6	U	21
p-Isopropyltoluene	U	6	U	22	U	8	U	21
Naphthalene	U	6	U	22	U	8	U	21
n-Propylbenzene	U	6	U	22	U	8	U	21
1,2,3-Trichlorobenzene	U	6	U	22	U	8	U	21
1,2,4-Trichlorobenzene	U	6	U	22	U	8	U	21
1,2,4-Trimethylbenzene	U	6	20 J	22	4 J	8	58	21
1,3,5-Trimethylbenzene	U	6	14 J	22	4 J	8	33	21
Methyl-tert-Butyl Ether	U	6	U	22	U	8	U	21

Table 1.2 (Cont) Results of the Analysis for VOC in Soil
WA # 2-215 Avtex Fibers
Based on dry Weight

Sample #	VBLK3		11-215-00403		11-215-00506		11-215-00605	
Location			BMI-3		Fly Ash Pile		Sulfate Basin No 1	
% Solids	100		68		60		33	
Collected			5/13/97		5/15/97		5/14/97	
Analyzed	5/23/97		5/23/97		5/23/97		5/23/97	
File Name	K18699.D		K18706.D		K18708.D		K18700.D	
Dil. Factor	1		1		1		1	
Compound	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
Chloromethane	U	5	U	7	U	8	U	15
Bromomethane	U	5	U	7	U	8	U	15
Vinyl chloride	U	5	U	7	U	8	U	15
Chloroethane	U	5	U	7	U	8	U	15
Methylene chloride	U	5	U	7	57	8	U	15
Acetone	U	5	14	7	U	8	150	15
Carbon Disulfide	U	5	U	7	U	8	U	15
1,1-Dichloroethene	U	5	U	7	U	8	U	15
1,1-Dichloroethane	U	5	U	7	U	8	U	15
Chloroform	U	5	U	7	8 J	8	U	15
1,2-Dichloroethane	U	5	U	7	U	8	U	15
2-Butanone	U	5	U	7	U	8	33	15
1,1,1,-Trichloroethane	U	5	U	7	U	8	U	15
Carbon tetrachloride	U	5	U	7	U	8	U	15
Bromodichloromethane	U	5	U	7	U	8	U	15
1,2-Dichloropropane	U	5	U	7	U	8	U	15
cis-1,3-Dichloropropene	U	5	U	7	U	8	U	15
Trichloroethene	U	5	U	7	U	8	U	15
Dibromochloromethane	U	5	U	7	U	8	U	15
1,1,2-Trichloroethane	U	5	U	7	U	8	U	15
Benzene	U	5	U	7	U	8	U	15
trans-1,3-Dichloropropene	U	5	U	7	U	8	U	15
Bromoform	U	5	U	7	U	8	U	15
4-Methyl-2-Pentanone	U	5	U	7	U	8	U	15
2-Hexanone	U	5	U	7	U	8	U	15
Tetrachloroethene	U	5	U	7	U	8	U	15
Toluene	U	5	U	7	U	8	U	15
1,1,2,2-Tetrachloroethane	U	5	U	7	U	8	U	15
Chlorobenzene	U	5	U	7	U	8	U	15
Ethyl benzene	U	5	U	7	U	8	U	15
Styrene	U	5	U	7	U	8	U	15
m,p Xylenes	U	5	U	7	U	8	U	15
o Xylene	U	5	U	7	U	8	U	15
1,2-Dibromoethane	U	5	U	7	U	8	U	15
1,1,1,2-Tetrachloroethane	U	5	U	7	U	8	U	15
1,2,3-Trichloropropane	U	5	U	7	U	8	U	15
Dichlorodifluoromethane	U	5	U	7	U	8	U	15
Trichlorofluoromethane	U	5	U	7	U	8	U	15
Dibromomethane	U	5	U	7	U	8	U	15
1,2-Dibromo-3-chloropropane	U	5	U	7	U	8	U	15
Bromobenzene	U	5	U	7	U	8	U	15
n-Butylbenzene	U	5	U	7	U	8	U	15
tert-Butylbenzene	U	5	U	7	U	8	U	15
sec-Butylbenzene	U	5	U	7	U	8	U	15
2-Chlorotoluene	U	5	U	7	U	8	U	15
4-Chlorotoluene	U	5	U	7	U	8	U	15
1,2-Dichlorobenzene	U	5	U	7	U	8	U	15
1,3-Dichlorobenzene	U	5	U	7	U	8	U	15
1,4-Dichlorobenzene	U	5	U	7	U	8	U	15
1,3-Dichloropropane	U	5	U	7	U	8	U	15
2,2-Dichloropropane	U	5	U	7	U	8	U	15
1,1-Dichloropropene	U	5	U	7	U	8	U	15
Hexachlorobutadiene	U	5	U	7	U	8	U	15
Isopropylbenzene	U	5	U	7	U	8	U	15
p-Isopropyltoluene	U	5	U	7	U	8	U	15
Naphthalene	U	5	U	7	U	8	U	15
n-Propylbenzene	U	5	U	7	U	8	U	15
1,2,3-Trichlorobenzene	U	5	U	7	U	8	U	15
1,2,4-Trichlorobenzene	U	5	U	7	U	8	U	15
1,2,4-Trimethylbenzene	U	5	U	7	U	8	U	15
1,3,5-Trimethylbenzene	U	5	U	7	U	8	U	15
Methyl-tert-Butyl Ether	U	5	U	7	U	8	U	15

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Table 1.3 Results of the Analysis for BNA in Soil
WA # 2-215 Avtex Fibers
Based on dry weight

SAMPLE # :	SBLK052197	11-215-00505	11-215-00506	11-215-00507	11-215-00501
FILE :	^AV001	^AV002	^AV005	^AV006	^AV007
LOCATION :	--	TREATMENT PLANT	FLY ASH PILE	BLANK	REFERENCE
COLLECTED :	--	05/15/97	05/15/97	05/15/97	05/15/97
EXTRACTED :	05/21/97	05/21/97	05/21/97	05/21/97	05/21/97
ANALYZED :	06/03/97	06/03/97	06/03/97	06/03/97	06/03/97
INJECTED :	11:43	12:37	15:21	16:20	17:15
MATRIX :	SOIL	SOIL	SOIL	SOIL	SOIL
DIL. FACT.:	1.0	1.0	1.0	1.0	1.0
% SOLID :	100	79	60	100	85
AMT. USED :	30	30	30	30	31
FINAL VOL :	5.0	5.0	5.0	5.0	5.0
UNITS :	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg

COMPOUND	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL
Phenol	U	1700	U	2100	U	2800	U	1700	U	1900
bis(-2-Chloroethyl)Ether	U	1700	U	2100	U	2800	U	1700	U	1900
2-Chlorophenol	U	1700	U	2100	U	2800	U	1700	U	1900
1,3-Dichlorobenzene	U	1700	U	2100	U	2800	U	1700	U	1900
1,4-Dichlorobenzene	U	1700	U	2100	U	2800	U	1700	U	1900
Benzyl alcohol	U	1700	U	2100	U	2800	U	1700	U	1900
1,2-Dichlorobenzene	U	1700	U	2100	U	2800	U	1700	U	1900
2-Methylphenol	U	1700	U	2100	U	2800	U	1700	U	1900
bis(2-Chloroisopropyl)ether	U	1700	U	2100	U	2800	U	1700	U	1900
4-Methylphenol	U	1700	U	2100	U	2800	U	1700	U	1900
N-Nitroso-Di-n-propylamine	U	1700	U	2100	U	2800	U	1700	U	1900
Hexachloroethane	U	1700	U	2100	U	2800	U	1700	U	1900
Nitrobenzene	U	1700	U	2100	U	2800	U	1700	U	1900
Isophorone	U	1700	U	2100	U	2800	U	1700	U	1900
2-Nitrophenol	U	1700	U	2100	U	2800	U	1700	U	1900
2,4-Dimethylphenol	U	1700	U	2100	U	2800	U	1700	U	1900
bis(2-Chloroethoxy)methane	U	1700	U	2100	U	2800	U	1700	U	1900
2,4-Dichlorophenol	U	1700	U	2100	U	2800	U	1700	U	1900
1,2,4-Trichlorobenzene	U	1700	U	2100	U	2800	U	1700	U	1900
Naphthalene	U	1700	U	2100	U	2800	U	1700	U	1900
4-Chloroaniline	U	1700	U	2100	U	2800	U	1700	U	1900
Hexachlorobutadiene	U	1700	U	2100	U	2800	U	1700	U	1900
4-Chloro-3-methylphenol	U	1700	U	2100	U	2800	U	1700	U	1900
2-Methylnaphthalene	U	1700	U	2100	U	2800	U	1700	U	1900
Hexachlorocyclopentadiene	U	1700	U	2100	U	2800	U	1700	U	1900
2,4,6-Trichlorophenol	U	1700	U	2100	U	2800	U	1700	U	1900
2,4,5-Trichlorophenol	U	8300	U	11000	U	14000	U	8300	U	9500
2-Chloronaphthalene	U	1700	U	2100	U	2800	U	1700	U	1900
2-Nitroaniline	U	8300	U	11000	U	14000	U	8300	U	9500
Dimethylphthalate	U	1700	U	2100	U	2800	U	1700	U	1900
Acenaphthylene	U	1700	U	2100	U	2800	U	1700	U	1900
3-Nitroaniline	U	8300	U	11000	U	14000	U	8300	U	9500
Acenaphthene	U	1700	U	2100	U	2800	U	1700	U	1900
2,4-Dinitrophenol	U	8300	U	11000	U	14000	U	8300	U	9500

Table 1.3 (Cont) Results of the Analysis for BNA in Soil
WA # 2-215 Avtex Fibers
Based on dry weight

SAMPLE # :	SBLK052197	11-215-00505	11-215-00506	11-215-00507	11-215-00501
FILE :	^AV001	^AV002	^AV005	^AV006	^AV007
LOCATION :	--	TREATMENT PLANT	FLY ASH PILE	BLANK	REFERENCE
COLLECTED :	--	05/15/97	05/15/97	05/15/97	05/15/97
EXTRACTED :	05/21/97	05/21/97	05/21/97	05/21/97	05/21/97
ANALYZED :	06/03/97	06/03/97	06/03/97	06/03/97	06/03/97
INJECTED :	11:43	12:37	15:21	16:20	17:15
MATRIX :	SOIL	SOIL	SOIL	SOIL	SOIL
DIL. FACT.:	1.0	1.0	1.0	1.0	1.0
% SOLID :	100	79	60	100	85
AMT. USED :	30	30	30	30	31
FINAL VOL :	5.0	5.0	5.0	5.0	5.0
UNITS :	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg

COMPOUND	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL
4-Nitrophenol	U	8300	U	11000	U	14000	U	8300	U	9500
Dibenzofuran	U	1700	U	2100	U	2800	U	1700	U	1900
2,6-Dinitrotoluene	U	1700	U	2100	U	2800	U	1700	U	1900
2,4-Dinitrotoluene	U	1700	U	2100	U	2800	U	1700	U	1900
Diethylphthalate	U	1700	U	2100	U	2800	190(J)	1700	U	1900
4-Chlorophenyl-phenylether	U	1700	U	2100	U	2800	U	1700	U	1900
Fluorene	U	1700	U	2100	U	2800	U	1700	U	1900
4-Nitroaniline	U	8300	U	11000	U	14000	U	8300	U	9500
4,6-Dinitro-2-methylphenol	U	8300	U	11000	U	14000	U	8300	U	9500
N-Nitrosodiphenylamine	U	1700	U	2100	U	2800	U	1700	U	1900
4-Bromophenyl-phenylether	U	1700	U	2100	U	2800	U	1700	U	1900
Hexachlorobenzene	U	1700	U	2100	U	2800	U	1700	U	1900
Pentachlorophenol	U	8300	U	11000	U	14000	U	8300	U	9500
Phenanthrene	U	1700	U	2100	U	2800	U	1700	U	1900
Anthracene	U	1700	U	2100	U	2800	U	1700	U	1900
Carbazole	U	1700	U	2100	U	2800	U	1700	U	1900
Di-n-butylphthalate	U	1700	U	2100	U	2800	U	1700	U	1900
Fluoranthene	U	1700	U	2100	U	2800	U	1700	U	1900
Pyrene	U	1700	U	2100	U	2800	U	1700	U	1900
Butylbenzylphthalate	U	1700	U	2100	U	2800	U	1700	U	1900
3,3'-Dichlorobenzidine	U	8300	U	11000	U	14000	U	8300	U	9500
Benzo(a)anthracene	U	1700	U	2100	U	2800	U	1700	U	1900
Bis(2-Ethylhexyl)phthalate	U	1700	U	2100	U	2800	U	1700	U	1900
Chrysene	U	1700	U	2100	U	2800	U	1700	U	1900
Di-n-octylphthalate	U	1700	U	2100	U	2800	U	1700	U	1900
Benzo(b)fluoranthene	U	1700	U	2100	U	2800	U	1700	U	1900
Benzo(k)fluoranthene	U	1700	U	2100	U	2800	U	1700	U	1900
Benzo(a)pyrene	U	1700	U	2100	U	2800	U	1700	U	1900
Indeno(1,2,3-cd)pyrene	U	1700	U	2100	U	2800	U	1700	U	1900
Dibenzo(a,h)anthracene	U	1700	U	2100	U	2800	U	1700	U	1900
Benzo(g,h,i)perylene	U	1700	U	2100	U	2800	U	1700	U	1900

Table 1.3 (Cont) Results of the Analysis for BNA in Soil
WA # 2-215 Avtex Fibers
Based on dry weight

SAMPLE # :	11-215-00502	11-215-00503	11-215-00504
FILE :	~AV008	~AV009	~AV010
LOCATION :	WETLAND AREA	EMERGENCY POND	PCB AREA
COLLECTED :	05/15/97	05/15/97	05/15/97
EXTRACTED :	05/21/97	05/21/97	05/21/97
ANALYZED :	06/03/97	06/03/97	06/03/97
INJECTED :	18:10	19:10	20:14
MATRIX :	SOIL	SOIL	SOIL
DIL. FACT.:	1.0	1.0	1.0
% SOLID :	80	72	77
AMT. USED :	31	30	30
FINAL VOL :	5.0	5.0	5.0
UNITS :	µg/kg	µg/kg	µg/kg

COMPOUND	CONC.	MDL	CONC.	MDL	CONC.	MDL
Phenol	U	2000	U	2300	U	2200
bis(-2-Chloroethyl)Ether	U	2000	U	2300	U	2200
2-Chlorophenol	U	2000	U	2300	U	2200
1,3-Dichlorobenzene	U	2000	U	2300	U	2200
1,4-Dichlorobenzene	U	2000	U	2300	U	2200
Benzyl alcohol	U	2000	U	2300	U	2200
1,2-Dichlorobenzene	U	2000	U	2300	U	2200
2-Methylphenol	U	2000	U	2300	U	2200
bis(2-Chloroisopropyl)ether	U	2000	U	2300	U	2200
4-Methylphenol	U	2000	U	2300	U	2200
N-Nitroso-Di-n-propylamine	U	2000	U	2300	U	2200
Hexachloroethane	U	2000	U	2300	U	2200
Nitrobenzene	U	2000	U	2300	U	2200
Isophorone	U	2000	U	2300	U	2200
2-Nitrophenol	U	2000	U	2300	U	2200
2,4-Dimethylphenol	U	2000	U	2300	U	2200
bis(2-Chloroethoxy)methane	U	2000	U	2300	U	2200
2,4-Dichlorophenol	U	2000	U	2300	U	2200
1,2,4-Trichlorobenzene	U	2000	U	2300	U	2200
Naphthalene	U	2000	U	2300	U	2200
4-Chloroaniline	U	2000	U	2300	U	2200
Hexachlorobutadiene	U	2000	U	2300	U	2200
4-Chloro-3-methylphenol	U	2000	U	2300	U	2200
2-Methylnaphthalene	U	2000	U	2300	U	2200
Hexachlorocyclopentadiene	U	2000	U	2300	U	2200
2,4,6-Trichlorophenol	U	2000	U	2300	U	2200
2,4,5-Trichlorophenol	U	11000	U	12000	U	11000
2-Chloronaphthalene	U	2000	U	2300	U	2200
2-Nitroaniline	U	11000	U	12000	U	11000
Dimethylphthalate	U	2000	U	2300	U	2200
Acenaphthylene	U	2000	U	2300	U	2200
3-Nitroaniline	U	11000	U	12000	U	11000
Acenaphthene	U	2000	U	2300	U	2200
2,4-Dinitrophenol	U	11000	U	12000	U	11000

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Table 1.3 (Cont) Results of the Analysis for BNA in Soil
WA # 2-215 Avtex Fibers
Based on dry weight

SAMPLE # :	11-215-00502	11-215-00503	11-215-00504
FILE :	^AV008	^AV009	^AV010
LOCATION :	WETLAND AREA	EMERGENCY POND	PCB AREA
COLLECTED :	05/15/97	05/15/97	05/15/97
EXTRACTED :	05/21/97	05/21/97	05/21/97
ANALYZED :	06/03/97	06/03/97	06/03/97
INJECTED :	18:10	19:10	20:14
MATRIX :	SOIL	SOIL	SOIL
DIL. FACT.:	1.0	1.0	1.0
% SOLID :	80	72	77
AMT. USED :	31	30	30
FINAL VOL :	5.0	5.0	5.0
UNITS :	µg/kg	µg/kg	µg/kg

COMPOUND	CONC.	MDL	CONC.	MDL	CONC.	MDL
4-Nitrophenol	U	11000	U	12000	U	11000
Dibenzofuran	U	2000	U	2300	U	2200
2,6-Dinitrotoluene	U	2000	U	2300	U	2200
2,4-Dinitrotoluene	U	2000	U	2300	U	2200
Diethylphthalate	U	2000	U	2300	U	2200
4-Chlorophenyl-phenylether	U	2000	U	2300	U	2200
Fluorene	U	2000	U	2300	U	2200
4-Nitroaniline	U	11000	U	12000	U	11000
4,6-Dinitro-2-methylphenol	U	11000	U	12000	U	11000
N-Nitrosodiphenylamine	U	2000	U	2300	U	2200
4-Bromophenyl-phenylether	U	2000	U	2300	U	2200
Hexachlorobenzene	U	2000	U	2300	U	2200
Pentachlorophenol	U	11000	U	12000	U	11000
Phenanthrene	U	2000	U	2300	U	2200
Anthracene	U	2000	U	2300	U	2200
Carbazole	U	2000	U	2300	U	2200
Di-n-butylphthalate	U	2000	U	2300	U	2200
Fluoranthene	U	2000	U	2300	U	2200
Pyrene	U	2000	U	2300	U	2200
Butylbenzylphthalate	U	2000	U	2300	U	2200
3,3'-Dichlorobenzidine	U	11000	U	12000	U	11000
Benzo(a)anthracene	U	2000	U	2300	U	2200
Bis(2-Ethylhexyl)phthalate	U	2000	U	2300	U	2200
Chrysene	U	2000	U	2300	1200(J)	2200
Di-n-octylphthalate	U	2000	U	2300	U	2200
Benzo(b)fluoranthene	U	2000	U	2300	U	2200
Benzo(k)fluoranthene	U	2000	U	2300	U	2200
Benzo(a)pyrene	U	2000	U	2300	U	2200
Indeno(1,2,3-cd)pyrene	U	2000	U	2300	U	2200
Dibenzo(a,h)anthracene	U	2000	U	2300	U	2200
Benzo(g,h,i)perylene	U	2000	U	2300	U	2200

Table 1. 4 Results of the TICs for BNA in Soil

WA # 2-215 Avtex Fibers

Sample #	SBLK050297	Unit	µg/kg
LabFile#	AV001	Con. Factor	166.7

	CAS#	Compound	Q	RT	Conc
1		No TICs Found			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

* the concentration is estimated - the response factor was assumed to be 1

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Table 1. 4 (Cont) Results of the TICs for BNA in Soil

WA # 2-215 Avtex Fibers

Sample #	11-215-00505 345	Unit	µg/kg
LabFile#	AV002	Con. Factor	209.1

	CAS#	Compound	Q	RT	Conc*
1		Unknown Acid		26.00	1000
2		Unknown		33.96	1300
3		Aldehyde		35.26	2300
4		Alkane		35.79	2700
5		Alkohol		35.90	3300
6		Aldehyde		37.50	1500
7		Alkane		38.18	5200
8		Alkohol		38.38	1900
9		Unknown		40.64	1700
10		Alkane		41.55	2100
11		Unknown		41.91	1500
12		Unknown		43.12	1700
13		Unknown		44.72	2300
14		Unknown		45.29	840
15		Unknown		46.27	1000
16					0
17					0
18					0
19					0
20					0

* the concentration is estimated - the response factor was assumed to be 1

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Table 1. 4 (Cont) Results of the TICs for BNA in Soil
WA # 2-215 Avtex Fibers

Sample #	11-215-00506 346	Unit	µg/kg
LabFile#	AV005	Con. Factor	278.7

	CAS#	Compound	Q	RT	Conc*
1	10544500	Sulfur, mol.	49	27.52	3900
2		Unknown		29.41	2000
3		Unknown		29.80	3600
4		Unknown		30.00	4200
5		Unknown		41.49	1700
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

* the concentration is estimated - the response factor was assumed to be 1

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Table 1. 4 (Cont) Results of the TICs for BNA in Soil
WA # 2-215 Avtex Fibers

Sample #	11-215-00507 347	Unit	µg/kg
LabFile#	AV006	Con. Factor	166.7

	CAS#	Compound	Q	RT	Conc
1		No TICs Found			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

* the concentration is estimated - the response factor was assumed to be 1

Table 1. 4 (Cont) Results of the TICs for BNA in Soil
WA # 2-215 Avtex Fibers

Sample #	11-215-00501 350	Unit	µg/kg
LabFile#	AV007	Con. Factor	192.7

	CAS#	Compound	Q	RT	Conc*
1		Unknown		25.85	960
2		Unknown Acid		25.97	1200
3		Alkane		33.88	960
4		Aldehyde		35.23	2900
5		Alkane		35.76	2500
6		Unknown		35.85	3500
7		Aldehyde		37.48	1500
8		Alkane		38.13	3700
9		Unknown		38.31	1200
10		Unknown		39.31	770
11		Unknown		40.59	1900
12		Unknown		41.20	770
13		Alkane		41.50	1200
14		Unknown		41.84	2100
15		Unknown		43.05	1900
16		Unknown		45.14	960
17		Unknown		46.19	960
18					0
19					0
20					0

* the concentration is estimated - the response factor was assumed to be 1

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Table 1. 4 (Cont) Results of the TICs for BNA in Soil
WA # 2-215 Avtex Fibers

Sample #	11-215-00502 351	Unit	µg/kg
LabFile#	AV008	Con. Factor	205.7

	CAS#	Compound	Q	RT	Conc
1		No TICs Found			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

* the concentration is estimated - the response factor was assumed to be 1

Table 1. 4 (Cont) Results of the TICs for BNA in Soil
WA # 2-215 Avtex Fibers

Sample #	11-215-00503 352	Unit	µg/kg
LabFile#	AV009	Con. Factor	230.1

	CAS#	Compound	Q	RT	Conc
1		No TICs Found			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

* the concentration is estimated - the response factor was assumed to be 1

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Table 1. 4 (Cont) Results of the TICs for BNA in Soil
WA # 2-215 Avtex Fibers

Sample #	11-215-00504 344	Unit	µg/kg
LabFile#	AV010	Con. Factor	212.1

	CAS#	Compound	Q	RT	Conc*
1		Unknown		24.85	3400
2		Unknown		25.33	6400
3		Unknown		25.74	1300
4		Unknown		25.99	2500
5		Cycloalkane		26.40	2300
6		Unknown		26.63	38000
7		Unknown		26.81	11000
8		Cycloalkane		27.01	1300
9		Unknown		27.09	1100
10	20273272	Bicyclohexyl, 4-phenyl-	44	27.24	23000
11		Unknown		27.68	7000
12		Unknown		28.20	4700
13		Unknown		31.37	3200
14		Unknown		32.68	3400
15		Unknown		33.32	1700
16		Unknown		33.48	3200
17		Unknown		34.22	1100
18		Unknown		38.41	3800
19		Unknown		39.68	4500
20		Unknown		41.44	2100

* the concentration is estimated - the response factor was assumed to be 1

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Table 1.5 Results of the Analysis for Pesticides/PCBs in Water
WA# 2-215 Avtex Fibers

Client ID Location	WBLK05149701 -		B 11-215-00046 Sulfate Basin No.5		B 11-215-00047 Fly Ash Basin No.4	
Analyte	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L
a-BHC	U	0.02	U	0.02	U	0.02
g-BHC	U	0.02	U	0.02	U	0.02
b-BHC	U	0.02	U	0.02	U	0.02
Heptachlor	U	0.02	U	0.02	U	0.02
d-BHC	U	0.02	U	0.02	U	0.02
Aldrin	U	0.02	U	0.02	U	0.02
Heptachlor Epoxide	U	0.02	U	0.02	U	0.02
g-Chlordane	U	0.02	U	0.02	U	0.02
a-Chlordane	U	0.02	U	0.02	U	0.02
Endosulfan (I)	U	0.02	U	0.02	U	0.02
p,p'-D D E	U	0.02	U	0.02	U	0.02
Dieldrin	U	0.02	U	0.02	U	0.02
Endrin	U	0.02	U	0.02	U	0.02
p,p'-D D D	U	0.02	U	0.02	U	0.02
Endosulfan (II)	U	0.02	U	0.02	U	0.02
p,p'-D D T	U	0.02	U	0.02	U	0.02
Endrin Aldehyde	U	0.02	U	0.02	U	0.02
Endosulfan Sulfate	U	0.02	U	0.02	U	0.02
Methoxychlor	U	0.02	U	0.02	U	0.02
Endrin Ketone	U	0.02	U	0.02	U	0.02
Aroclor 1016	U	0.3	U	0.3	U	0.3
Aroclor 1221	U	0.5	U	0.5	U	0.5
Aroclor 1232	U	0.3	U	0.3	U	0.3
Aroclor 1242	U	0.3	U	0.3	U	0.3
Aroclor 1248	U	0.3	U	0.3	U	0.3
Aroclor 1254	U	0.3	U	0.3	U	0.3
Aroclor 1260	U	0.3	U	0.3	U	0.3

Table 1.5 (Cont) Results of the Analysis for Pesticides/PCBs in Water
WA# 2-215 Avtex Fibers

Client ID	WBLK05199701		B 11-215-00414		B 11-215-00410		B 11-215-00411		B 11-215-00412	
Location	-		Outfall 004		Reference		BMI - 1		BMI - 2	
Analyte	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L
a-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
g-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
b-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Heptachlor	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
d-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Aldrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Heptachlor Epoxide	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
g-Chlordane	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
a-Chlordane	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endosulfan (I)	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
p,p'-D D E	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Dieldrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
p,p'-D D D	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endosulfan (II)	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
p,p'-D D T	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endrin Aldehyde	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endosulfan Sulfate	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Methoxychlor	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endrin Ketone	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Aroclor 1016	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1221	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
Aroclor 1232	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1242	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1248	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1254	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1260	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3

Table 1.5 (Cont) Results of the Analysis for Pesticides/PCBs in Water
WA# 2-215 Avtex Fibers

Client ID	B 11-215-00413		B 11-215-00419		B 11-215-00415		B 11-215-00601		B 11-215-00602	
Location	BMI - 3		Reference No.2		Outfall 005		Sulfate Basin No.1		Emergency [illegible]	
Analyte	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	[illegible] µg/L
a-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
g-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
b-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Heptachlor	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
d-BHC	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Aldrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Heptachlor Epoxide	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
g-Chlordane	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
a-Chlordane	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endosulfan (I)	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
p,p'-D D E	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Dieldrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endrin	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
p,p'-D D D	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endosulfan (II)	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
p,p'-D D T	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endrin Aldehyde	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endosulfan Sulfate	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Methoxychlor	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Endrin Ketone	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02
Aroclor 1016	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1221	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
Aroclor 1232	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1242	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1248	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3
Aroclor 1254	U	0.3	U	0.3	U	0.3	U	0.3	U	[illegible]
Aroclor 1260	U	0.3	U	0.3	U	0.3	U	0.3	U	[illegible]

Table 1.5 (Cont) Results of the Analysis for Pesticides/PCBs in Water
WA# 2-215 Avtex Fibers

Client ID	B 11-215-00603		B 11-215-00604	
Location	Polish Pond		Outfall 004	
Analyte	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L
a-BHC	U	0.02	U	0.02
g-BHC	U	0.02	U	0.02
b-BHC	U	0.02	U	0.02
Heptachlor	U	0.02	U	0.02
d-BHC	U	0.02	U	0.02
Aldrin	U	0.02	U	0.02
Heptachlor Epoxide	U	0.02	U	0.02
g-Chlordane	U	0.02	U	0.02
a-Chlordane	U	0.02	U	0.02
Endosulfan (I)	U	0.02	U	0.02
p,p'-D D E	U	0.02	U	0.02
Dieldrin	U	0.02	U	0.02
Endrin	U	0.02	U	0.02
p,p'-D D D	U	0.02	U	0.02
Endosulfan (II)	U	0.02	U	0.02
p,p'-D D T	U	0.02	U	0.02
Endrin Aldehyde	U	0.02	U	0.02
Endosulfan Sulfate	U	0.02	U	0.02
Methoxychlor	U	0.02	U	0.02
Endrin Ketone	U	0.02	U	0.02
Aroclor 1016	U	0.3	U	0.3
Aroclor 1221	U	0.5	U	0.5
Aroclor 1232	U	0.3	U	0.3
Aroclor 1242	U	0.3	U	0.3
Aroclor 1248	U	0.3	U	0.3
Aroclor 1254	U	0.3	U	0.3
Aroclor 1260	U	0.3	U	0.3

Table 1.6 Results of the Analysis for Pesticides/PCBs in Soil
WA# 2-215 Avtex Fibers
(based on dry weight)

Client ID	SBLK05179701		A 11-215-00403		A 11-215-00605		A 11-215-00404		A 11-215-00405	
Location	-		BMI - 3		Sulfate Basin No.1		BMI - 4		BMI - 5	
% Solid	100		80		34		78		72	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	M[illegible] µg/kg
a-BHC	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
g-BHC	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
b-BHC	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Heptachlor	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
d-BHC	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Aldrin	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Heptachlor Epoxide	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
g-Chlordane	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
a-Chlordane	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Endosulfan (I)	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
p,p'-D D E	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Dieldrin	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Endrin	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
p,p'-D D D	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Endosulfan (II)	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
p,p'-D D T	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Endrin Aldehyde	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Endosulfan Sulfate	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Methoxychlor	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Endrin Ketone	U	3.30	U	4.20	U	9.80	U	4.30	U	4.60
Aroclor 1016	U	42.0	U	52.0	U	120.0	U	54.0	U	57.0
Aroclor 1221	U	83.0	U	100.0	U	240.0	U	110.0	U	110.0
Aroclor 1232	U	42.0	U	52.0	U	120.0	U	54.0	U	57.0
Aroclor 1242	U	42.0	U	52.0	U	120.0	U	54.0	U	57.0
Aroclor 1248	U	42.0	U	52.0	U	120.0	U	54.0	U	57.0
Aroclor 1254	U	42.0	U	52.0	U	120.0	U	54.0	U	[illegible]
Aroclor 1260	U	42.0	U	52.0	U	120.0	U	54.0	470	[illegible]

Table 1.6 (Cont) Results of the Analysis for Pesticides/PCBs in Soil
WA# 2-215 Avtex Fibers
(based on dry weight)

Client ID	A 11-215-00406		A 11-215-00407		A 11-215-00607		A 11-215-00608		A 11-215-00606	
Location	BMI - 6		BMI - 1		Polishing Pond		Viscose creek		Emergency Pond	
% Solid	78		57		27		61		31	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
g-BHC	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
b-BHC	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Heptachlor	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
d-BHC	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Aldrin	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Heptachlor Epoxide	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
g-Chlordane	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
a-Chlordane	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Endosulfan (I)	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
p,p'-D D E	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Dieldrin	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Endrin	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
p,p'-D D D	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Endosulfan (II)	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
p,p'-D D T	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Endrin Aldehyde	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Endosulfan Sulfate	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Methoxychlor	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Endrin Ketone	U	4.2	U	5.80	U	13.00	U	5.40	U	11.00
Aroclor 1016	U	54.0	U	72.0	U	160.0	U	68.0	U	130.0
Aroclor 1221	U	110.0	U	140.0	U	310.0	U	140.0	U	270.0
Aroclor 1232	U	54.0	U	72.0	U	160.0	U	68.0	U	130.0
Aroclor 1242	U	54.0	U	72.0	U	160.0	U	68.0	U	130.0
Aroclor 1248	U	54.0	U	72.0	U	160.0	U	68.0	450 W	130.0
Aroclor 1254	U	54.0	U	72.0	2200	160.0	U	68.0	U	130.0
Aroclor 1260	U	54.0	U	72.0	3000	160.0	U	68.0	400	130.0

W Denotes weathered pattern of pcb is obeserved.

Table 1.6 (Cont) Results of the Analysis for Pesticides/PCBs in Soil
WA# 2-215 Avtex Fibers
(based on dry weight)

Client ID	B 11-215-00044		B 11-215-00045		A 11-215-00401		A 11-215-00402	
Location	Sulfate Basin No.5		Fly Ash Basin No. 4		Reference		BMI - 2	
% Solid	16		40		27		67	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	21.00	U	8.40	U	12.00	U	4.90
g-BHC	U	21.00	U	8.40	U	12.00	U	4.90
b-BHC	U	21.00	U	8.40	U	12.00	U	4.90
Heptachlor	U	21.00	U	8.40	U	12.00	U	4.90
d-BHC	U	21.00	U	8.40	U	12.00	U	4.90
Aldrin	U	21.00	U	8.40	U	12.00	U	4.90
Heptachlor Epoxide	U	21.00	U	8.40	U	12.00	U	4.90
g-Chlordane	U	21.00	U	8.40	U	12.00	U	4.90
a-Chlordane	U	21.00	U	8.40	U	12.00	U	4.90
Endosulfan (I)	U	21.00	U	8.40	U	12.00	U	4.90
p,p'-D D E	U	21.00	U	8.40	U	12.00	U	4.90
Dieldrin	U	21.00	U	8.40	U	12.00	U	4.90
Endrin	U	21.00	U	8.40	U	12.00	U	4.90
p,p'-D D D	U	21.00	U	8.40	U	12.00	U	4.90
Endosulfan (II)	U	21.00	U	8.40	U	12.00	U	4.90
p,p'-D D T	U	21.00	U	8.40	U	12.00	U	4.90
Endrin Aldehyde	U	21.00	U	8.40	U	12.00	U	4.90
Endosulfan Sulfate	U	21.00	U	8.40	U	12.00	U	4.90
Methoxychlor	U	21.00	U	8.40	U	12.00	U	4.90
Endrin Ketone	U	21.00	U	8.40	U	12.00	U	4.90
Aroclor 1016	U	270.0	U	100.0	U	150.0	U	62.0
Aroclor 1221	U	530.0	U	210.0	U	300.0	U	120.0
Aroclor 1232	U	270.0	U	100.0	U	150.0	U	62.0
Aroclor 1242	U	270.0	U	100.0	U	150.0	U	62.0
Aroclor 1248	U	270.0	U	100.0	U	150.0	U	62.0
Aroclor 1254	U	270.0	U	100.0	U	150.0	U	62.0
Aroclor 1260	U	270.0	U	100.0	U	150.0	U	62.0

Table 1.6 (Cont) Results of the Analysis for Pesticides/PCBs in Soil
WA# 2-215 Avtex Fibers
(based on dry weight)

Client ID	SBLK05219701		11-215-00410		11-215-00501		11-215-00502		11-215-00503	
Location	-		Reference No.2		Reference		Wetland Area		Emergency Pond	
% Solid	100		65		85		80		72	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
g-BHC	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
b-BHC	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Heptachlor	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
d-BHC	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Aldrin	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Heptachlor Epoxide	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
g-Chlordane	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
a-Chlordane	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Endosulfan (I)	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
p,p'-D D E	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Dieldrin	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Endrin	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
p,p'-D D D	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Endosulfan (II)	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
p,p'-D D T	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Endrin Aldehyde	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Endosulfan Sulfate	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Methoxychlor	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Endrin Ketone	U	3.30	U	5.10	U	3.90	U	4.20	U	4.50
Toxaphene	U	83.0	U	130.0	U	97.0	U	100.0	U	110.0
Aroclor 1016	U	42.0	U	64.0	U	49.0	U	52.0	U	57.0
Aroclor 1221	U	83.0	U	130.0	U	97.0	U	100.0	U	110.0
Aroclor 1232	U	42.0	U	64.0	U	49.0	U	52.0	U	57.0
Aroclor 1242	U	42.0	U	64.0	U	49.0	U	52.0	U	57.0
Aroclor 1248	U	42.0	U	64.0	U	49.0	U	52.0	U	57.0
Aroclor 1254	U	42.0	U	64.0	U	49.0	U	52.0	U	57.0
Aroclor 1260	U	42.0	U	64.0	U	49.0	U	52.0	U	57.0

Table 1.6 (Cont) Results of the Analysis for Pesticides/PCBs in Soil
WA# 2-215 Avtex Fibers
(based on dry weight)

Client ID	11-215-00504		11-215-00505		11-215-00506		11-215-00507	
Location	PCB Area		Treatment Plant		Fly Ash Pile		Blank	
% Solid	77		79		60		100	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	4.30	U	4.20	U	5.60	U	3.30
g-BHC	U	4.30	U	4.20	U	5.60	U	3.30
b-BHC	U	4.30	U	4.20	U	5.60	U	3.30
Heptachlor	U	4.30	U	4.20	U	5.60	U	3.30
d-BHC	U	4.30	U	4.20	U	5.60	U	3.30
Aldrin	U	4.30	U	4.20	U	5.60	U	3.30
Heptachlor Epoxide	U	4.30	U	4.20	U	5.60	U	3.30
g-Chlordane	U	4.30	U	4.20	U	5.60	U	3.30
a-Chlordane	U	4.30	U	4.20	U	5.60	U	3.30
Endosulfan (I)	U	4.30	U	4.20	U	5.60	U	3.30
p,p'-D D E	U	4.30	U	4.20	U	5.60	U	3.30
Dieldrin	U	4.30	U	4.20	U	5.60	U	3.30
Endrin	U	4.30	U	4.20	U	5.60	U	3.30
p,p'-D D D	U	4.30	U	4.20	U	5.60	U	3.30
Endosulfan (II)	U	4.30	U	4.20	U	5.60	U	3.30
p,p'-D D T	U	4.30	U	4.20	U	5.60	U	3.30
Endrin Aldehyde	U	4.30	U	4.20	U	5.60	U	3.30
Endosulfan Sulfate	U	4.30	U	4.20	U	5.60	U	3.30
Methoxychlor	U	4.30	U	4.20	U	5.60	U	3.30
Endrin Ketone	U	4.30	U	4.20	U	5.60	U	3.30
Aroclor 1016	U	53.0	U	52.0	U	70.0	U	42.0
Aroclor 1221	U	110.0	U	100.0	U	140.0	U	83.0
Aroclor 1232	U	53.0	U	52.0	U	70.0	U	42.0
Aroclor 1242	U	53.0	U	52.0	U	70.0	U	42.0
Aroclor 1248	84 W	53.0	U	52.0	U	70.0	U	42.0
Aroclor 1254	340 W	53.0	U	52.0	U	70.0	U	42.0
Aroclor 1260	U	53.0	U	52.0	U	70.0	U	42.0

W Denotes weatherd pattern of pcb is observed.

Table 1.7 Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	MBLK 051597		11-215-00060		11-215-00061		11-215-00062		11-215-00063	
Location	N/A		Sulfate Basin #5		Sulfate Basin #5		Sulfate Basin #5		Sulfate Basin #5	
Percent Solid	100		19		20		23		20	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	4.0	U	21	U	20	U	17	U	20
g-BHC	U	4.0	U	21	U	20	U	17	U	20
b-BHC	U	4.0	3.9 J	21	U	20	U	17	U	20
Heptachlor	U	4.0	U	21	U	20	U	17	U	20
d-BHC	U	4.0	U	21	U	20	U	17	U	20
Aldrin	U	4.0	U	21	U	20	U	17	4.8 J	20
Heptachlor Epoxide	U	4.0	U	21	U	20	U	17	U	20
g-Chlordane	U	4.0	U	21	U	20	U	17	U	20
a-Chlordane	U	4.0	U	21	U	20	U	17	U	20
Endosulfan (I)	U	4.0	U	21	U	20	U	17	U	20
p,p'-D D E	U	4.0	11 J	21	8.7 J	20	6.6 J	17	8.5 J	20
Dieldrin	U	4.0	U	21	U	20	U	17	U	20
Endrin	U	4.0	U	21	U	20	U	17	U	20
p,p'-D D D	U	4.0	U	21	U	20	U	17	U	20
Endosulfan (II)	U	4.0	U	21	U	20	U	17	U	20
p,p'-D D T	U	4.0	U	21	U	20	U	17	U	20
Endrin Aldehyde	U	4.0	U	21	U	20	U	17	U	20
Endosulfan Sulfate	U	4.0	U	21	U	20	U	17	U	20
Methoxychlor	1.5 J	4.0	U	21	U	20	U	17	U	20
Endrin Ketone	U	4.0	U	21	U	20	U	17	U	20
Toxaphene	U	40	U	210	U	200	U	170	U	200
Aroclor 1016	U	20	U	110	U	99	U	87	U	99
Aroclor 1221	U	40	U	210	U	200	U	170	U	200
Aroclor 1232	U	20	U	110	U	99	U	87	U	99
Aroclor 1242	U	20	U	110	U	99	U	87	U	99
Aroclor 1248	U	20	U	110	U	99	U	87	U	99
Aroclor 1254	U	20	190 W	110	200 W	99	180 W	87	270 W	99
Aroclor 1260	U	20	190 W	110	190 W	99	130 W	87	210 W	99

W denotes "weathered"

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00064		11-215-00071		11-215-00072		11-215-00073		11-215-00[illegible]	
Location	Sulfate Basin #5		Outfall 001		Outfall 001		Outfall 001		Outfall 001	
Percent Solid	20		28		29		24		27	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	20	U	14	U	14	U	17	U	15
g-BHC	U	20	U	14	U	14	U	17	U	15
b-BHC	U	20	U	14	U	14	U	17	U	15
Heptachlor	U	20	U	14	U	14	U	17	U	15
d-BHC	U	20	U	14	U	14	U	17	U	15
Aldrin	U	20	U	14	U	14	U	17	U	15
Heptachlor Epoxide	U	20	U	14	U	14	6.1 J	17	U	15
g-Chlordane	U	20	U	14	U	14	U	17	U	15
a-Chlordane	U	20	U	14	U	14	U	17	U	15
Endosulfan (I)	U	20	U	14	U	14	U	17	U	15
p,p'-D D E	11 J	20	17	14	15	14	22	17	14 J	15
Dieldrin	U	20	4.9 J	14	U	14	U	17	U	15
Endrin	U	20	U	14	U	14	U	17	U	15
p,p'-D D D	U	20	U	14	U	14	U	17	U	15
Endosulfan (II)	U	20	U	14	U	14	U	17	U	15
p,p'-D D T	U	20	U	14	U	14	U	17	U	15
Endrin Aldehyde	U	20	U	14	U	14	U	17	U	15
Endosulfan Sulfate	U	20	U	14	U	14	U	17	U	15
Methoxychlor	U	20	U	14	U	14	U	17	U	15
Endrin Ketone	U	20	U	14	U	14	U	17	U	15
Toxaphene	U	200	U	140	U	140	U	170	U	150
Aroclor 1016	U	100	U	71	U	68	U	83	U	73
Aroclor 1221	U	200	U	140	U	140	U	170	U	[illegible]
Aroclor 1232	U	100	U	71	U	68	U	83	U	[illegible]
Aroclor 1242	U	100	U	71	U	68	U	83	U	[illegible]
Aroclor 1248	U	100	U	71	U	68	U	83	U	73
Aroclor 1254	290 W	100	83 W	71	83 W	68	140 W	83	80 W	73
Aroclor 1260	210 W	100	120 W	71	370 W	68	360 W	83	160 W	73

W denotes "weathered"

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Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00075		11-215-00076		11-215-00077		11-215-00080		11-215-00081	
Location	Outfall 001		Outfall 001		Outfall 001		Reference		Reference	
Percent Solid	25		26		28		25		29	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	16	U	15	U	14	U	16	U	14
g-BHC	U	16	U	15	U	14	U	16	U	14
b-BHC	U	16	U	15	U	14	U	16	U	14
Heptachlor	U	16	U	15	1.8 J	14	U	16	U	14
d-BHC	U	16	U	15	U	14	U	16	U	14
Aldrin	U	16	U	15	U	14	U	16	U	14
Heptachlor Epoxide	U	16	U	15	U	14	15 J	16	7.7 J	14
g-Chlordane	U	16	U	15	U	14	U	16	U	14
a-Chlordane	U	16	U	15	U	14	U	16	U	14
Endosulfan (I)	U	16	U	15	U	14	U	16	U	14
p,p'-D D E	16	16	U	15	18	14	23	16	17	14
Dieldrin	U	16	U	15	3.5 J	14	U	16	11 J	14
Endrin	U	16	U	15	U	14	U	16	U	14
p,p'-D D D	U	16	U	15	U	14	U	16	U	14
Endosulfan (II)	U	16	U	15	U	14	U	16	U	14
p,p'-D D T	U	16	U	15	U	14	U	16	U	14
Endrin Aldehyde	U	16	U	15	U	14	U	16	U	14
Endosulfan Sulfate	U	16	U	15	U	14	U	16	U	14
Methoxychlor	U	16	U	15	U	14	U	16	U	14
Endrin Ketone	U	16	U	15	U	14	U	16	U	14
Toxaphene	U	160	U	150	U	140	U	160	U	140
Aroclor 1016	U	79	U	76	U	71	U	79	U	68
Aroclor 1221	U	160	U	150	U	140	U	160	U	140
Aroclor 1232	U	79	U	76	U	71	U	79	U	68
Aroclor 1242	U	79	U	76	U	71	U	79	U	68
Aroclor 1248	U	79	U	76	U	71	U	79	U	68
Aroclor 1254	58 W J	79	73 W	76	61 W J	71	240 W	79	120 W	68
Aroclor 1260	390 W	79	210 W	76	110 W	71	250 W	79	100 W	68

W denotes "weathered"

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00082		11-215-00083		11-215-00084		11-215-00085		11-215-00[illegible]	
Location	Reference		Reference		Reference		Reference		Reference	
Percent Solid	29		27		29		29		29	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	14	U	15	U	14	U	14	U	14
g-BHC	U	14	U	15	1.3 J	14	U	14	U	14
b-BHC	U	14	U	15	U	14	U	14	U	14
Heptachlor	U	14	U	15	U	14	U	14	U	14
d-BHC	U	14	U	15	U	14	U	14	U	14
Aldrin	U	14	U	15	U	14	U	14	U	14
Heptachlor Epoxide	13 J	14	U	15	U	14	U	14	U	14
g-Chlordane	U	14	U	15	U	14	U	14	U	14
a-Chlordane	5.6 J	14	U	15	U	14	U	14	U	14
Endosulfan (I)	U	14	U	15	U	14	U	14	U	14
p,p'-D D E	21	14	20	15	18	14	16	14	16	14
Dieldrin	U	14	5.7 J	15	4.3 J	14	4.8 J	14	5.6 J	14
Endrin	U	14	U	15	U	14	U	14	U	14
p,p'-D D D	U	14	U	15	U	14	U	14	U	14
Endosulfan (II)	U	14	U	15	U	14	U	14	U	14
p,p'-D D T	U	14	U	15	U	14	U	14	U	14
Endrin Aldehyde	U	14	U	15	U	14	U	14	U	14
Endosulfan Sulfate	U	14	U	15	U	14	U	14	U	14
Methoxychlor	U	14	U	15	U	14	U	14	U	14
Endrin Ketone	U	14	U	15	U	14	U	14	U	14
Toxaphene	U	140	U	150	U	140	U	140	U	140
Aroclor 1016	U	68	U	73	U	68	U	69	U	68
Aroclor 1221	U	140	U	150	U	140	U	140	U	140
Aroclor 1232	U	68	U	73	U	68	U	69	U	[illegible]
Aroclor 1242	U	68	U	73	U	68	U	69	U	[illegible]
Aroclor 1248	U	68	U	73	U	68	U	69	U	[illegible]
Aroclor 1254	240 W	68	73 W	73	150 W	68	52 W J	69	51 W J	68
Aroclor 1260	260 W	68	130 W	73	170 W	68	130 W	69	110 W	68

W denotes "weathered"

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Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00087		MBLK 051697		11-215-00201		11-215-00202		11-215-00203	
Location	Reference		N/A		TP-6-9		Ref. -5-19		Ref. -2-11	
Percent Solid	30		100		27		30		26	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	13	U	4.0	U	15	U	13	U	15
g-BHC	U	13	U	4.0	U	15	U	13	U	15
b-BHC	U	13	U	4.0	U	15	U	13	U	15
Heptachlor	U	13	U	4.0	U	15	U	13	U	15
d-BHC	U	13	U	4.0	U	15	U	13	U	15
Aldrin	U	13	U	4.0	U	15	U	13	U	15
Heptachlor Epoxide	6.2 J	13	U	4.0	U	15	U	13	U	15
g-Chlordane	U	13	U	4.0	U	15	U	13	U	15
a-Chlordane	U	13	U	4.0	U	15	U	13	U	15
Endosulfan (I)	U	13	U	4.0	U	15	U	13	U	15
p,p'-D D E	17	13	U	4.0	U	15	U	13	U	15
Dieldrin	4.8 J	13	U	4.0	U	15	U	13	U	15
Endrin	U	13	U	4.0	U	15	U	13	U	15
p,p'-D D D	U	13	U	4.0	U	15	U	13	U	15
Endosulfan (II)	U	13	U	4.0	U	15	U	13	U	15
p,p'-D D T	U	13	U	4.0	U	15	U	13	U	15
Endrin Aldehyde	U	13	U	4.0	U	15	U	13	U	15
Endosulfan Sulfate	U	13	U	4.0	U	15	U	13	U	15
Methoxychlor	U	13	U	4.0	U	15	U	13	U	15
Endrin Ketone	U	13	U	4.0	U	15	U	13	U	15
Toxaphene	U	130	U	40	U	150	U	130	U	150
Aroclor 1016	U	67	U	20	U	73	U	65	U	73
Aroclor 1221	U	130	U	40	U	150	U	130	U	150
Aroclor 1232	U	67	U	20	U	73	U	65	U	73
Aroclor 1242	U	67	U	20	U	73	U	65	U	73
Aroclor 1248	U	67	U	20	U	73	U	65	U	73
Aroclor 1254	53 W J	67	U	20	U	73	U	65	U	73
Aroclor 1260	62 W J	67	U	20	25 W J	73	18 W J	65	12 W J	73

W denotes "weathered"

00060 [redacted]

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00204		11-215-00205		11-215-00206		11-215-00207		11-215-00[illegible]	
Location	WA-?-?**		TP-3-19		FA-10-8		FA-10-10		WA-A-50	
Percent Solid	30		27		31		24		29	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	30	U	15	U	13	U	17	U	14
g-BHC	U	30	U	15	U	13	U	17	U	14
b-BHC	U	30	U	15	U	13	U	17	U	14
Heptachlor	U	30	U	15	U	13	U	17	U	14
d-BHC	U	30	U	15	U	13	U	17	U	14
Aldrin	U	30	U	15	U	13	U	17	U	14
Heptachlor Epoxide	U	30	U	15	U	13	U	17	U	14
g-Chlordane	U	30	U	15	U	13	U	17	U	14
a-Chlordane	U	30	U	15	U	13	U	17	U	14
Endosulfan (I)	U	30	U	15	U	13	U	17	U	14
p,p'-D D E	U	30	U	15	U	13	U	17	U	14
Dieldrin	U	30	U	15	U	13	U	17	U	14
Endrin	U	30	U	15	U	13	U	17	U	14
p,p'-D D D	U	30	U	15	U	13	U	17	U	14
Endosulfan (II)	U	30	U	15	U	13	U	17	U	14
p,p'-D D T	U	30	U	15	U	13	U	17	U	14
Endrin Aldehyde	U	30	U	15	U	13	U	17	U	14
Endosulfan Sulfate	U	30	U	15	U	13	U	17	U	14
Methoxychlor	U	30	U	15	U	13	U	17	U	14
Endrin Ketone	U	30	U	15	U	13	U	17	U	14
Toxaphene	U	300	U	150	U	130	U	170	U	140
Aroclor 1016	U	150	U	74	U	63	U	83	U	68
Aroclor 1221	U	300	U	150	U	130	U	170	U	140
Aroclor 1232	U	150	U	74	U	63	U	83	U	[illegible]
Aroclor 1242	U	150	U	74	U	63	U	83	U	[illegible]
Aroclor 1248	U	150	U	74	U	63	U	83	U	68
Aroclor 1254	U	150	U	74	U	63	U	83	U	68
Aroclor 1260	160 W	150	220 W	74	40 W J	63	57 W J	83	640 W	68

W denotes "weathered"
** on chain of custody 1-215-006 the location of sample 11-215-00204 is given as "WA-?-?"

[redacted]

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Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00209		11-215-00210		11-215-00211		11-215-00212		11-215-00213	
Location	Ref.-6-1		Ref.-6-7		Ref.-5-18		Ref.-2-10		Ref.-5-10	
Percent Solid	30		29		25		25		31	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	13	U	14	U	16	U	16	U	13
g-BHC	U	13	U	14	U	16	U	16	U	13
b-BHC	U	13	U	14	U	16	U	16	U	13
Heptachlor	U	13	U	14	U	16	U	16	U	13
d-BHC	U	13	U	14	U	16	U	16	U	13
Aldrin	U	13	U	14	U	16	U	16	U	13
Heptachlor Epoxide	U	13	U	14	U	16	U	16	U	13
g-Chlordane	U	13	U	14	U	16	U	16	U	13
a-Chlordane	U	13	U	14	U	16	U	16	U	13
Endosulfan (I)	U	13	U	14	U	16	U	16	U	13
p,p'-D D E	U	13	U	14	U	16	U	16	U	13
Dieldrin	U	13	U	14	U	16	U	16	U	13
Endrin	U	13	U	14	U	16	U	16	U	13
p,p'-D D D	U	13	U	14	U	16	U	16	U	13
Endosulfan (II)	U	13	U	14	U	16	U	16	U	13
p,p'-D D T	U	13	U	14	U	16	U	16	U	13
Endrin Aldehyde	U	13	U	14	U	16	U	16	U	13
Endosulfan Sulfate	U	13	U	14	U	16	U	16	U	13
Methoxychlor	U	13	U	14	U	16	U	16	U	13
Endrin Ketone	U	13	3.6 J	14	U	16	U	16	U	13
Toxaphene	U	130	U	140	U	160	U	160	U	130
Aroclor 1016	U	67	U	68	U	78	U	79	U	64
Aroclor 1221	U	130	U	140	U	160	U	160	U	130
Aroclor 1232	U	67	U	68	U	78	U	79	U	64
Aroclor 1242	U	67	U	68	U	78	U	79	U	64
Aroclor 1248	U	67	U	68	U	78	U	79	U	64
Aroclor 1254	U	67	U	68	U	78	U	79	95 W	64
Aroclor 1260	250 W	67	90 W	68	U	78	U	79	100 W	64

W denotes "weathered"

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00214		11-215-00215		11-215-00216		11-215-00217		11-215-00[illegible]	
Location	Ref.-1-17		Ref.-4-17		Ref.-5-9		FA-10-8		FA-109	
Percent Solid	32		26		29		27		32	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	12	U	15	U	14	U	15	U	12
g-BHC	U	12	U	15	U	14	U	15	U	12
b-BHC	U	12	U	15	U	14	U	15	U	12
Heptachlor	U	12	U	15	U	14	U	15	U	12
d-BHC	U	12	U	15	U	14	U	15	U	12
Aldrin	U	12	U	15	U	14	U	15	U	12
Heptachlor Epoxide	U	12	U	15	U	14	U	15	U	12
g-Chlordane	U	12	U	15	U	14	U	15	U	12
a-Chlordane	U	12	U	15	U	14	U	15	U	12
Endosulfan (I)	U	12	U	15	U	14	U	15	U	12
p,p'-D D E	U	12	U	15	U	14	U	15	U	12
Dieldrin	U	12	U	15	U	14	U	15	U	12
Endrin	U	12	U	15	U	14	U	15	U	12
p,p'-D D D	U	12	U	15	U	14	U	15	U	12
Endosulfan (II)	U	12	U	15	U	14	U	15	U	12
p,p'-D D T	U	12	U	15	U	14	U	15	U	12
Endrin Aldehyde	U	12	U	15	U	14	U	15	U	12
Endosulfan Sulfate	U	12	U	15	U	14	U	15	U	12
Methoxychlor	U	12	U	15	U	14	U	15	U	12
Endrin Ketone	3.2 J	12	U	15	U	14	U	15	U	12
Toxaphene	U	120	U	150	U	140	U	150	U	120
Aroclor 1016	U	61	U	76	U	68	U	74	U	61
Aroclor 1221	U	120	U	150	U	140	U	150	U	[illegible]
Aroclor 1232	U	61	U	76	U	68	U	74	U	[illegible]
Aroclor 1242	U	61	U	76	U	68	U	74	U	[illegible]
Aroclor 1248	U	61	U	76	U	68	U	74	U	61
Aroclor 1254	U	61	U	76	U	68	U	74	U	61
Aroclor 1260	U	61	140 W	76	83 W	68	U	74	U	61

W denotes "weathered"

[redacted]

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	MBLK 051797		11-215-00066		11-215-00219		11-215-00220		11-215-00221	
Location	N/A		Sulfate Basin #5		FA-10-8		Ref.-1-8		Ref.-1-17	
Percent Solid	100		23		34		28		25	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	4	U	17	U	12	U	14	U	17
g-BHC	U	4	U	17	U	12	U	14	U	17
b-BHC	U	4	U	17	U	12	U	14	U	17
Heptachlor	U	4	U	17	U	12	U	14	U	17
d-BHC	U	4	U	17	U	12	U	14	U	17
Aldrin	U	4	U	17	U	12	U	14	U	17
Heptachlor Epoxide	U	4	U	17	U	12	U	14	U	17
g-Chlordane	U	4	U	17	U	12	U	14	U	17
a-Chlordane	U	4	U	17	U	12	U	14	U	17
Endosulfan (I)	U	4	U	17	U	12	U	14	U	17
p,p'-D D E	U	4	4.5 J	17	U	12	U	14	U	17
Dieldrin	U	4	U	17	U	12	U	14	U	17
Endrin	U	4	U	17	U	12	U	14	U	17
p,p'-D D D	U	4	U	17	U	12	U	14	U	17
Endosulfan (II)	U	4	U	17	U	12	U	14	U	17
p,p'-D D T	U	4	U	17	U	12	4.2 J	14	U	17
Endrin Aldehyde	U	4	U	17	U	12	U	14	U	17
Endosulfan Sulfate	U	4	U	17	U	12	U	14	U	17
Methoxychlor	U	4	U	17	U	12	U	14	U	17
Endrin Ketone	U	4	U	17	1.0 J	12	U	14	U	17
Toxaphene	U	40	U	170	U	120	U	140	U	170
Aroclor 1016	U	20	U	86	U	59	U	70	U	84
Aroclor 1221	U	40	U	170	U	120	U	140	U	170
Aroclor 1232	U	20	U	86	U	59	U	70	U	84
Aroclor 1242	U	20	U	86	U	59	U	70	U	84
Aroclor 1248	U	20	U	86	U	59	U	70	U	84
Aroclor 1254	U	20	170 W	86	U	59	U	70	U	84
Aroclor 1260	U	20	160 W	86	U	59	U	70	U	84

W denotes "weathered"

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00222		11-215-00223		11-215-00224		11-215-00225		11-215-0	
Location	FA-11-21		FA-10-9		Ref.-5-20		Ref.-5-19		Ref.-2-12	
Percent Solid	24		29		27		30		26	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	16	U	14	U	15	U	16	U	18
g-BHC	U	16	U	14	U	15	U	16	U	18
b-BHC	U	16	U	14	U	15	U	16	U	18
Heptachlor	U	16	U	14	U	15	U	16	U	18
d-BHC	U	16	U	14	U	15	U	16	U	18
Aldrin	U	16	U	14	U	15	U	16	U	18
Heptachlor Epoxide	U	16	U	14	U	15	3.4 J	16	U	18
g-Chlordane	U	16	U	14	U	15	U	16	U	18
a-Chlordane	U	16	U	14	U	15	U	16	U	18
Endosulfan (I)	U	16	U	14	U	15	U	16	U	18
p,p'-D D E	U	16	U	14	U	15	U	16	U	18
Dieldrin	U	16	U	14	U	15	U	16	U	18
Endrin	U	16	U	14	U	15	U	16	U	18
p,p'-D D D	U	16	U	14	U	15	U	16	U	18
Endosulfan (II)	U	16	U	14	U	15	U	16	U	18
p,p'-D D T	6.2 J	16	U	14	U	15	U	16	U	18
Endrin Aldehyde	U	16	U	14	U	15	U	16	U	18
Endosulfan Sulfate	U	16	U	14	U	15	U	16	U	18
Methoxychlor	U	16	U	14	U	15	U	16	U	18
Endrin Ketone	U	16	U	14	U	15	U	16	U	18
Toxaphene	U	160	U	140	U	150	U	160	U	180
Aroclor 1016	U	81	U	68	U	74	U	82	U	89
Aroclor 1221	U	160	U	140	U	150	U	160	U	180
Aroclor 1232	U	81	U	68	U	74	U	82	U	[illegible]
Aroclor 1242	U	81	U	68	U	74	U	62	U	[illegible]
Aroclor 1248	U	81	U	68	U	74	U	82	U	89
Aroclor 1254	U	81	U	68	U	74	U	82	U	89
Aroclor 1260	910 W	81	U	68	U	74	72 W J	82	U	89

W denotes "weathered"

00065 [redacted]

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00227		11-215-00228		11-215-00229		11-215-00230		11-215-00231	
Location	FA-10-10		FA-11-12		Ref.-6-10		FA-10-18		TP-1-2	
Percent Solid	28		26		30		26		30	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	14	U	15	U	12	U	15	U	13
g-BHC	U	14	U	15	U	12	U	15	U	13
b-BHC	U	14	U	15	U	12	U	15	U	13
Heptachlor	U	14	U	15	U	12	U	15	U	13
d-BHC	U	14	U	15	U	12	U	15	U	13
Aldrin	U	14	U	15	U	12	U	15	U	13
Heptachlor Epoxide	U	14	U	15	U	12	U	15	U	13
g-Chlordane	U	14	U	15	U	12	U	15	U	13
a-Chlordane	U	14	U	15	U	12	U	15	U	13
Endosulfan (I)	U	14	U	15	U	12	U	15	U	13
p,p'-D D E	U	14	U	15	U	12	U	15	U	13
Dieldrin	U	14	U	15	U	12	U	15	U	13
Endrin	U	14	U	15	U	12	U	15	U	13
p,p'-D D D	U	14	U	15	U	12	U	15	U	13
Endosulfan (II)	U	14	U	15	U	12	U	15	U	13
p,p'-D D T	U	14	U	15	U	12	U	15	U	13
Endrin Aldehyde	U	14	U	15	U	12	U	15	U	13
Endosulfan Sulfate	U	14	U	15	U	12	U	15	U	13
Methoxychlor	U	14	U	15	U	12	U	15	U	13
Endrin Ketone	U	14	U	15	U	12	U	15	U	13
Toxaphene	U	140	U	150	U	120	U	150	U	130
Aroclor 1016	U	71	U	75	U	62	U	76	U	65
Aroclor 1221	U	140	U	150	U	120	U	150	U	130
Aroclor 1232	U	71	U	75	U	62	U	76	U	65
Aroclor 1242	U	71	U	75	U	62	U	76	U	65
Aroclor 1248	U	71	U	75	U	62	U	76	U	65
Aroclor 1254	U	71	U	75	U	62	U	76	U	65
Aroclor 1260	U	71	250 W	75	220 W	62	U	76	46 W J	65

W denotes "weathered"

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00232		11-215-00233		11-215-00234		11-215-00235		11-215-002[illegible]	
Location	TP-1-1		TP-2-2		Ref.-6-9		WA-North-20		WA-South-17	
Percent Solid	30		28		24		35		29	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	13	U	14	U	16	U	11	U	14
g-BHC	U	13	U	14	U	16	U	11	U	14
b-BHC	U	13	U	14	U	16	U	11	U	14
Heptachlor	U	13	U	14	U	16	U	11	U	14
d-BHC	U	13	U	14	U	16	U	11	U	14
Aldrin	U	13	U	14	U	16	U	11	U	14
Heptachlor Epoxide	U	13	U	14	U	16	U	11	U	14
g-Chlordane	U	13	U	14	U	16	U	11	U	14
a-Chlordane	U	13	U	14	U	16	U	11	U	14
Endosulfan (I)	U	13	U	14	U	16	U	11	U	14
p,p'-D D E	U	13	U	14	U	16	U	11	U	14
Dieldrin	U	13	U	14	U	16	U	11	U	14
Endrin	U	13	U	14	U	16	U	11	U	14
p,p'-D D D	U	13	U	14	U	16	U	11	U	14
Endosulfan (II)	U	13	U	14	U	16	U	11	U	14
p,p'-D D T	U	13	U	14	U	16	U	11	U	14
Endrin Aldehyde	U	13	U	14	U	16	U	11	U	14
Endosulfan Sulfate	U	13	U	14	U	16	U	11	U	14
Methoxychlor	U	13	U	14	U	16	U	11	U	14
Endrin Ketone	U	13	U	14	U	16	22	11	U	14
Toxaphene	U	130	U	140	U	160	U	110	U	140
Aroclor 1016	U	65	U	71	U	80	U	55	U	68
Aroclor 1221	U	130	U	140	U	160	U	110	U	[illegible]
Aroclor 1232	U	65	U	71	U	80	U	55	U	[illegible]
Aroclor 1242	U	65	U	71	U	80	U	55	U	[illegible]
Aroclor 1248	U	65	U	71	U	80	U	55	U	68
Aroclor 1254	U	65	U	71	U	80	180 W	55	46 W J	68
Aroclor 1260	110 W	65	180 W	71	U	80	6300 W	55	28 W J	68

W denotes "weathered"

[redacted]

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00091		11-215-00092		11-215-00093		11-215-00094		MBLK 051997	
Location	Outfall 002		Outfall 002		Outfall 002		Outfall 002		N/A	
Percent Solid	28		26		27		28		100	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	14	U	15	U	15	U	14	U	4
g-BHC	U	14	0.8 J	15	U	15	U	14	U	4
b-BHC	U	14	U	15	U	15	U	14	U	4
Heptachlor	U	14	U	15	2.2 J	15	3.9 J	14	U	4
d-BHC	U	14	U	15	U	15	U	14	U	4
Aldrin	U	14	U	15	U	15	U	14	U	4
Heptachlor Epoxide	4.1 J	14	U	15	U	15	6.7 J	14	U	4
g-Chlordane	U	14	U	15	U	15	U	14	U	4
a-Chlordane	U	14	U	15	U	15	U	14	U	4
Endosulfan (I)	U	14	U	15	U	15	U	14	U	4
p,p'-D D E	18	14	26	15	16	15	17	14	U	4
Dieldrin	U	14	U	15	U	15	U	14	U	4
Endrin	U	14	U	15	15	15	12 J	14	U	4
p,p'-D D D	U	14	U	15	U	15	U	14	U	4
Endosulfan (II)	U	14	U	15	U	15	U	14	U	4
p,p'-D D T	U	14	U	15	U	15	U	14	U	4
Endrin Aldehyde	U	14	U	15	U	15	U	14	U	4
Endosulfan Sulfate	U	14	U	15	U	15	U	14	U	4
Methoxychlor	U	14	U	15	U	15	U	14	U	4
Endrin Ketone	U	14	U	15	U	15	U	14	U	4
Toxaphene	U	140	U	150	U	150	U	140	U	40
Aroclor 1016	U	71	U	74	U	73	U	71	U	20
Aroclor 1221	U	140	U	150	U	150	U	140	U	40
Aroclor 1232	U	71	U	74	U	73	U	71	U	20
Aroclor 1242	U	71	U	74	U	73	U	71	U	20
Aroclor 1248	U	71	U	74	U	73	U	71	U	20
Aroclor 1254	71 W	71	190 W	74	94 W	73	69 W	71	U	20
Aroclor 1260	280 W	71	3600 W	74	290 W	73	320 W	71	U	20

W denotes "weathered"

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00090		11-215-00095		11-215-00096		11-215-00097		11-215-00[illegible]	
Location	Outfall 002		Outfall 002		Outfall 002		Outfall 002		Outfall 004	
Percent Solid	27		25		28		25		28	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	15	U	16	U	14	U	16	U	14
g-BHC	U	15	U	16	U	14	U	16	U	14
b-BHC	U	15	U	16	U	14	U	16	U	14
Heptachlor	U	15	2.8 J	16	2.3 J	14	U	16	2.1 J	14
d-BHC	U	15	U	16	U	14	U	16	U	14
Aldrin	U	15	U	16	U	14	U	16	U	14
Heptachlor Epoxide	6.3 J	15	U	16	4.2 J	14	U	16	7.1 J	14
g-Chlordane	U	15	U	16	U	14	U	16	U	14
a-Chlordane	U	15	U	16	U	14	U	16	U	14
Endosulfan (I)	U	15	U	16	U	14	U	16	U	14
p,p'-D D E	20	15	16	16	17	14	21	16	24	14
Dieldrin	5.5 J	15	U	16	U	14	4.6 J	16	U	14
Endrin	19	15	19	16	11 J	14	16	16	11 J	14
p,p'-D D D	U	15	U	16	U	14	U	16	U	14
Endosulfan (II)	U	15	U	16	U	14	U	16	U	14
p,p'-D D T	U	15	U	16	U	14	U	16	U	14
Endrin Aldehyde	U	15	U	16	U	14	U	16	U	14
Endosulfan Sulfate	U	15	U	16	U	14	U	16	U	14
Methoxychlor	U	15	U	16	U	14	U	16	U	14
Endrin Ketone	U	15	U	16	U	14	U	16	U	14
Toxaphene	U	150	U	160	U	140	U	160	U	140
Aroclor 1016	U	73	U	79	U	71	U	78	U	69
Aroclor 1221	U	150	U	160	U	140	U	160	U	[illegible]
Aroclor 1232	U	73	U	79	U	71	U	78	U	[illegible]
Aroclor 1242	U	73	U	79	U	71	U	78	U	[illegible]
Aroclor 1248	U	73	U	79	U	71	U	76	U	69
Aroclor 1254	66 W J	73	48 W J	79	63 W J	71	110 W	78	120 W	69
Aroclor 1260	390 W	73	250 W	79	190 W	71	120 W	78	360 W	69

W denotes "weathered"

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00101		11-215-00102		11-215-00103		11-215-00104		11-215-00105	
Location	Outfall 004		Outfall 004		Outfall 004		Outfall 004		Outfall 004	
Percent Solid	26		26		25		26		26	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	15	U	15	U	16	U	15	U	15
g-BHC	U	15	U	15	U	16	U	15	U	15
b-BHC	U	15	U	15	U	16	U	15	U	15
Heptachlor	1.7 J	15	U	15	U	16	U	15	U	15
d-BHC	U	15	U	15	U	16	U	15	U	15
Aldrin	11 J	15	24	15	29	16	16	15	18	15
Heptachlor Epoxide	U	15	22	15	U	16	16	15	20	15
g-Chlordane	U	15	U	15	U	16	U	15	U	15
a-Chlordane	U	15	U	15	U	16	U	15	U	15
Endosulfan (I)	U	15	U	15	U	16	U	15	U	15
p,p'-D D E	32	15	35	15	44	16	38	15	28	15
Dieldrin	U	15	U	15	U	16	U	15	U	15
Endrin	21	15	U	15	U	16	22	15	U	15
p,p'-D D D	U	15	U	15	U	16	U	15	U	15
Endosulfan (II)	U	15	U	15	U	16	U	15	U	15
p,p'-D D T	U	15	U	15	U	16	U	15	U	15
Endrin Aldehyde	U	15	U	15	U	16	U	15	U	15
Endosulfan Sulfate	U	15	U	15	U	16	U	15	U	15
Methoxychlor	U	15	U	15	U	16	U	15	U	15
Endrin Ketone	U	15	U	15	U	16	U	15	U	15
Toxaphene	U	150	U	150	U	160	U	150	U	150
Aroclor 1016	U	74	U	74	U	78	U	77	U	77
Aroclor 1221	U	150	U	150	U	160	U	150	U	150
Aroclor 1232	U	74	U	74	U	78	U	77	U	77
Aroclor 1242	U	74	U	74	U	78	U	77	U	77
Aroclor 1248	U	74	U	74	U	78	U	77	U	77
Aroclor 1254	240 W	74	450 W	74	1300 W	78	490 W	77	890 W	77
Aroclor 1260	420 W	74	2100 W	74	1100 W	78	470 W	77	3400 W	77

W denotes "weathered"

[redacted]

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00106		11-215-00107		11-215-00110		11-215-00111		11-215-00[illegible]	
Location	Outfall 004		Outfall 004		Downstream		Downstream		Downstream	
Percent Solid	27		26		28		25		27	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	15	U	15	U	14	U	15	U	14
g-BHC	U	15	U	15	U	14	U	15	U	14
b-BHC	U	15	U	15	U	14	U	15	U	14
Heptachlor	5.7 J	15	2.5 J	15	2.3 J	14	5.1 J	15	5.2 J	14
d-BHC	U	15	U	15	U	14	U	15	U	14
Aldrin	U	15	U	15	U	14	U	15	U	14
Heptachlor Epoxide	U	15	13 J	15	37	14	13 J	15	U	14
g-Chlordane	U	15	U	15	U	14	U	15	U	14
a-Chlordane	U	15	U	15	U	14	U	15	U	14
Endosulfan (I)	U	15	U	15	U	14	U	15	U	14
p,p'-D D E	22	15	25	15	49	14	31	15	36	14
Dieldrin	U	15	U	15	U	14	U	15	U	14
Endrin	21	15	U	15	U	14	U	15	U	14
p,p'-D D D	U	15	U	15	U	14	U	15	U	14
Endosulfan (II)	U	15	U	15	U	14	U	15	U	14
p,p'-D D T	U	15	U	15	U	14	U	15	U	14
Endrin Aldehyde	U	15	U	15	U	14	U	15	U	14
Endosulfan Sulfate	U	15	U	15	U	14	U	15	U	14
Methoxychlor	U	15	U	15	U	14	U	15	U	14
Endrin Ketone	U	15	U	15	U	14	U	15	U	14
Toxaphene	U	150	U	150	U	140	U	150	U	140
Aroclor 1016	U	73	U	75	U	70	U	76	U	69
Aroclor 1221	U	150	U	150	U	140	U	150	U	140
Aroclor 1232	U	73	U	75	U	70	U	76	U	[illegible]
Aroclor 1242	U	73	U	75	U	70	U	76	U	[illegible]
Aroclor 1248	U	73	U	75	U	70	U	76	U	69
Aroclor 1254	370 W	73	550 W	75	U	70	U	76	U	69
Aroclor 1260	360 W	73	2600 W	75	16000 W	70	6200 W	76	9200 W	69

W denotes "weathered"

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00113		11-215-00114		11-215-00115		11-215-00116		11-215-00117	
Location	Downstream		Downstream		Downstream		Downstream		Downstream	
Percent Solid	29		26		23		25		24	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	14	U	15	U	17	U	15	U	17
g-BHC	U	14	U	15	U	17	U	15	U	17
b-BHC	U	14	U	15	U	17	U	15	U	17
Heptachlor	4.2 J	14	U	15	3.7 J	17	U	15	2.4 J	17
d-BHC	U	14	U	15	U	17	U	15	U	17
Aldrin	U	14	U	15	U	17	U	15	U	17
Heptachlor Epoxide	13 J	14	15	15	17 J	17	27	15	20	17
g-Chlordane	U	14	U	15	U	17	U	15	U	17
a-Chlordane	U	14	U	15	U	17	U	15	U	17
Endosulfan (I)	U	14	U	15	U	17	U	15	U	17
p,p'-D D E	32	14	35	15	38	17	53	15	58	17
Dieldrin	U	14	U	15	U	17	U	15	U	17
Endrin	U	14	U	15	U	17	U	15	U	17
p,p'-D D D	U	14	U	15	U	17	U	15	U	17
Endosulfan (II)	U	14	U	15	U	17	U	15	U	17
p,p'-D D T	U	14	U	15	U	17	U	15	U	17
Endrin Aldehyde	U	14	U	15	U	17	U	15	U	17
Endosulfan Sulfate	U	14	U	15	U	17	U	15	U	17
Methoxychlor	U	14	U	15	U	17	U	15	U	17
Endrin Ketone	U	14	U	15	U	17	U	15	U	17
Toxaphene	U	140	U	150	U	170	U	150	U	170
Aroclor 1016	U	68	U	74	U	87	U	77	U	83
Aroclor 1221	U	140	U	150	U	170	U	150	U	170
Aroclor 1232	U	68	U	74	U	87	U	77	U	83
Aroclor 1242	U	68	U	74	U	87	U	77	U	83
Aroclor 1248	U	68	U	74	U	87	U	77	U	83
Aroclor 1254	U	68	U	74	U	87	U	77	U	83
Aroclor 1260	4600 W	68	6200 W	74	9600 W	87	16000 W	77	9000 W	83

W denotes "weathered"

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	MBLK 052097		11-215-00130		11-215-00131		11-215-00132		11-215-00[illegible]	
Location	N/A		Reference		Reference		BM1-1		BM1-1	
Percent Solid	100		15		16		18		17	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	4	U	26	U	25	U	21	U	24
g-BHC	U	4	U	26	U	25	U	21	U	24
b-BHC	U	4	U	26	U	25	U	21	U	24
Heptachlor	U	4	U	26	U	25	U	21	U	24
d-BHC	U	4	U	26	U	25	U	21	U	24
Aldrin	U	4	U	26	U	25	4.6 J	21	U	24
Heptachlor Epoxide	U	4	13 J	26	U	25	9.3 J	21	8.9 J	24
g-Chlordane	U	4	U	26	U	25	U	21	U	24
a-Chlordane	U	4	U	26	U	25	U	21	U	24
Endosulfan (I)	U	4	U	26	U	25	U	21	U	24
p,p'-D D E	U	4	U	26	6 J	25	U	21	U	24
Dieldrin	U	4	U	26	3 J	25	4.2 J	21	3.9 J	24
Endrin	U	4	U	26	U	25	U	21	U	24
p,p'-D D D	U	4	U	26	U	25	U	21	U	24
Endosulfan (II)	U	4	U	26	U	25	U	21	U	24
p,p'-D D T	U	4	U	26	U	25	U	21	U	24
Endrin Aldehyde	U	4	U	26	U	25	U	21	U	24
Endosulfan Sulfate	U	4	U	26	U	25	U	21	U	24
Methoxychlor	U	4	4.9 J	26	U	25	U	21	U	24
Endrin Ketone	U	4	U	26	U	25	U	21	U	24
Toxaphene	U	40	U	260	U	250	U	210	U	240
Aroclor 1016	U	20	U	130	U	120	U	110	U	120
Aroclor 1221	U	40	U	260	U	250	U	210	U	240
Aroclor 1232	U	20	U	130	U	120	U	110	U	[illegible]
Aroclor 1242	U	20	U	130	U	120	U	110	U	[illegible]
Aroclor 1248	U	20	U	130	U	120	U	110	U	120
Aroclor 1254	U	20	190 W	130	70 W J	120	82 W J	110	70 W J	120
Aroclor 1260	U	20	U	130	U	120	U	110	U	120

W denotes "weathered"

[redacted]

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00134		11-215-00135		11-215-00136		11-215-00137		11-215-00138	
Location	BM1-2		BM1-2		BM1-3		BM1-3		BM1-4	
Percent Solid	20		21		22		21		21	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	19	U	19	U	18	U	19	U	18
g-BHC	U	19	U	19	U	18	U	19	U	18
b-BHC	U	19	U	19	U	18	U	19	U	18
Heptachlor	U	19	U	19	U	18	U	19	U	18
d-BHC	U	19	U	19	U	18	U	19	U	18
Aldrin	U	19	U	19	U	18	U	19	U	18
Heptachlor Epoxide	11 J	19	7.8 J	19	7.8 J	18	8.1 J	19	U	18
g-Chlordane	U	19	U	19	15 J	18	U	19	U	18
a-Chlordane	U	19	U	19	U	18	U	19	U	18
Endosulfan (I)	U	19	U	19	U	18	U	19	U	18
p,p'-D D E	U	19	U	19	U	18	U	19	63	18
Dieldrin	3.8 J	19	U	19	U	18	U	19	U	18
Endrin	U	19	U	19	U	18	U	19	U	18
p,p'-D D D	U	19	U	19	U	18	U	19	U	18
Endosulfan (II)	U	19	U	19	U	18	U	19	U	18
p,p'-D D T	U	19	U	19	U	18	U	19	U	18
Endrin Aldehyde	U	19	U	19	U	18	U	19	U	18
Endosulfan Sulfate	U	19	U	19	U	18	U	19	U	18
Methoxychlor	U	19	U	19	U	18	U	19	U	18
Endrin Ketone	U	19	U	19	U	18	U	19	U	18
Toxaphene	U	190	U	190	U	180	U	190	U	180
Aroclor 1016	U	96	U	93	U	90	U	95	U	90
Aroclor 1221	U	190	U	190	U	180	U	190	U	180
Aroclor 1232	U	96	U	93	U	90	U	95	U	90
Aroclor 1242	U	96	U	93	U	90	U	95	U	90
Aroclor 1248	U	96	U	93	U	90	U	95	U	90
Aroclor 1254	78 W J	96	76 W J	93	81 W J	90	64 W J	95	2300 W	90
Aroclor 1260	31 W J	96	U	93	64 W J	90	47 W J	95	510 W	90

W denotes "weathered"

Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00139		11-215-00140		11-215-00237		11-215-00238		MBLK 052	
Location	BM1-5		BM1-5		TP-4A-8 (22.5c)		TP-7-5 (34.8 tg)		N/A	
Percent Solid	24		23		27		28		100	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	17	U	17	U	15	U	16	U	4
g-BHC	U	17	U	17	U	15	U	16	U	4
b-BHC	U	17	U	17	U	15	U	16	U	4
Heptachlor	U	17	U	17	U	15	U	16	U	4
d-BHC	U	17	U	17	U	15	U	16	U	4
Aldrin	U	17	U	17	U	15	U	16	U	4
Heptachlor Epoxide	8.8 J	17	8.2 J	17	U	15	U	16	U	4
g-Chlordane	U	17	U	17	U	15	U	16	U	4
a-Chlordane	U	17	U	17	U	15	U	16	U	4
Endosulfan (I)	U	17	U	17	U	15	U	16	U	4
p,p'-D D E	U	17	U	17	U	15	U	16	U	4
Dieldrin	U	17	U	17	U	15	U	16	U	4
Endrin	U	17	U	17	U	15	U	16	U	4
p,p'-D D D	U	17	U	17	U	15	U	16	U	4
Endosulfan (II)	U	17	U	17	U	15	U	16	U	4
p,p'-D D T	U	17	U	17	U	15	U	16	U	4
Endrin Aldehyde	U	17	U	17	U	15	U	16	U	4
Endosulfan Sulfate	U	17	U	17	U	15	U	16	U	4
Methoxychlor	U	17	U	17	U	15	U	16	U	4
Endrin Ketone	U	17	U	17	U	15	U	16	U	4
Toxaphene	U	170	U	170	U	150	U	160	U	40
Aroclor 1016	U	83	U	85	U	73	U	79	U	20
Aroclor 1221	U	170	U	170	U	150	U	160	U	[illegible]
Aroclor 1232	U	83	U	85	U	73	U	79	U	[illegible]
Aroclor 1242	U	83	U	85	U	73	U	79	U	[illegible]
Aroclor 1248	U	83	U	85	U	73	U	79	U	20
Aroclor 1254	62 W J	83	64 W J	85	U	73	U	79	U	20
Aroclor 1260	27 W J	83	U	85	740 W	73	32 W J	79	U	20

W denotes "weathered"

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Table 1.7 (Cont) Results of the Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00065		11-215-00070	
Location	Sulfate Basin #5		Outfall 001	
Percent Solid	22		28	
Analyte	Conc µg/kg	MDL µg/kg	Conc µg/kg	MDL µg/kg
a-BHC	U	18	U	14
g-BHC	U	18	U	14
b-BHC	U	18	U	14
Heptachlor	5.8 J	18	U	14
d-BHC	U	18	U	14
Aldrin	5.6 J	18	U	14
Heptachlor Epoxide	U	18	5.5 J	14
g-Chlordane	U	18	U	14
a-Chlordane	U	18	U	14
Endosulfan (I)	U	18	U	14
p,p'-D D E	13 J	18	20	14
Dieldrin	U	18	7.6 J	14
Endrin	26	18	U	14
p,p'-D D D	U	18	U	14
Endosulfan (II)	U	18	U	14
p,p'-D D T	U	18	U	14
Endrin Aldehyde	U	18	U	14
Endosulfan Sulfate	U	18	U	14
Methoxychlor	U	18	U	14
Endrin Ketone	U	18	U	14
Toxaphene	U	180	U	140
Aroclor 1016	U	91	U	71
Aroclor 1221	U	180	U	140
Aroclor 1232	U	91	U	71
Aroclor 1242	U	91	U	71
Aroclor 1248	U	91	U	71
Aroclor 1254	110 W	91	200 W	71
Aroclor 1260	110 W	91	230 W	71

W denotes "weathered"

Table 1.8 Results of the Analysis for TAL Metals in Water
WA # 2-215 Avtex Fibers

Client ID**		Method Blank		00410		00411		00412		00413		00419	
Location		Lab		Reference		BMI-1		BMI-2		BMI-3		Reference No.2	
Parameter	Analysis Method	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L
Aluminum	ICAP	U	50	U	50	U	50	U	50	U	50	U	50
Antimony	AA-Fur	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Arsenic	AA-Fur	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Barium	ICAP	U	3.0	31	3.0	32	3.0	32	3.0	32	3.0	30	3.0
Beryllium	ICAP	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
Cadmium	ICAP	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0
Calcium	ICAP	U	100	34000	100	35000	100	34000	100	33000	100	34000	100
Chromium	ICAP	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Cobalt	ICAP	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Copper	ICAP	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Iron	ICAP	U	25	77	25	85	25	75	25	73	25	76	25
Lead	AA-Fur	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Magnesium	ICAP	U	500	11000	500	11000	500	11000	500	11000	500	11000	500
Manganese	ICAP	U	2.0	9.2	2.0	18	2.0	16	2.0	12	2.0	7.6	2.0
Mercury	Cold Vapor	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
Nickel	ICAP	U	10	U	10	U	10	U	10	U	10	U	10
Potassium	ICAP	U	2000	2800	2000	2500	2000	3000	2000	2900	2000	2600	2000
Selenium	AA-Fur	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Silver	ICAP	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Sodium	ICAP	U	500	7400	500	8600	500	8100	500	8000	500	7200	500
Thallium	AA-Fur	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Vanadium	ICAP	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Zinc	ICAP	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0

** All client IDs (except the Method Blank) should be prefixed by the alphanumeric "A11-215-"

Table 1.8 (Cont) Results of the Analysis for TAL Metals in Water
WA # 2-215 Avtex Fibers

Client ID** / Location		00414 Outfall 004		00415 Outfall 005		00601 Sulfate Basin No.1		00602 Emergency Pond		00603 Polish Pond		00604 Outfall 004	
Parameter	Analysis Method	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L
Aluminum	ICAP	U	50	U	50	140	50	180	50	940	50	200	50
Antimony	AA-Fur	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Arsenic	AA-Fur	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Barium	ICAP	33	3.0	32	3.0	25	3.0	22	3.0	62	3.0	13	3.0
Beryllium	ICAP	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
Cadmium	ICAP	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0
Calcium	ICAP	34000	100	33000	100	37000	100	52000	100	69000	100	24000	100
Chromium	ICAP	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Cobalt	ICAP	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Copper	ICAP	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Iron	ICAP	63	25	59	25	220	25	600	25	1900	25	400	25
Lead	AA-Fur	U	2.2	U	2.2	U	4.4	U	2.2	U	2.2	U	4.4
Magnesium	ICAP	11000	500	11000	500	23000	500	24000	500	14000	500	7300	500
Manganese	ICAP	7.2	2.0	6.0	2.0	120	2.0	290	2.0	1900	2.0	45	2.0
Mercury	Cold Vapor	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
Nickel	ICAP	U	10	U	10	U	10	U	10	U	10	U	10
Potassium	ICAP	2700	2000	2700	2000	3600	2000	3900	2000	5400	2000	3700	2000
Selenium	AA-Fur	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Silver	ICAP	U	5.0	U	5.0	U	5.0	5.1	5.0	U	5.0	U	5.0
Sodium	ICAP	8100	500	7800	500	300000	500	31000	500	93000	500	270000	500
Thallium	AA-Fur	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2
Vanadium	ICAP	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0
Zinc	ICAP	U	5.0	U	5.0	160	5.0	1700	5.0	240	5.0	59	5.0

** All client IDs should be prefixed by the alphanumeric "A11-215-"

Table 1.8 (Cont) Results of the Analysis for TAL Metals in Water
WA # 2-215 Avtex Fibers

Client ID**		00046		00047	
Location		Sulfate Basin No.5		Fly Ash Basin No.4	
Parameter	Analysis Method	Conc µg/L	MDL µg/L	Conc µg/L	MDL µg/L
Aluminum	ICAP	U	50	210	50
Antimony	AA-Fur	U	2.2	U	2.2
Arsenic	AA-Fur	U	2.2	18	2.2
Barium	ICAP	66	3.0	28	3.0
Beryllium	ICAP	U	2.0	U	2.0
Cadmium	ICAP	U	3.0	U	3.0
Calcium	ICAP	39000	100	30000	100
Chromium	ICAP	U	5.0	U	5.0
Cobalt	ICAP	U	5.0	U	5.0
Copper	ICAP	U	5.0	U	5.0
Iron	ICAP	37	25	93	25
Lead	AA-Fur	U	4.4	U	4.4
Magnesium	ICAP	11000	500	11000	500
Manganese	ICAP	7.0	2.0	23	2.0
Mercury	Cold Vapor	U	0.20	U	0.20
Nickel	ICAP	U	10	U	10
Potassium	ICAP	3800	2000	5400	2000
Selenium	AA-Fur	U	2.2	U	2.2
Silver	ICAP	U	5.0	U	5.0
Sodium	ICAP	91000	500	7900	500
Thallium	AA-Fur	U	2.2	U	2.2
Vanadium	ICAP	U	5.0	U	5.0
Zinc	ICAP	120	5.0	U	5.0

** All client IDs should be prefixed by the alphanumeric "A11-215-"

Table 1.9 Results of the Analysis for TAL Metals in Soil
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		Method Blank		11-215-00044		11-215-00045		11-215-00401		11-215-00402		11-215-00403	
Location		Lab		Sulfate Basin No.5		Fly Ash Basin No.4		Reference		BMI-2		BMI-3	
% Solids		100		18		40		26		61		74	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	U	17	8100	76	14000	23	9100	42	4600	18	3000	16
Antimony	ICAP	U	6.0	30	27	U	8.2	U	15	U	6.5	U	5.5
Arsenic	AA-Fur	U	0.50	17	2.2	72	0.84	4.7	1.1	2.9	0.50	1.5	0.47
Barium	ICAP	U	0.60	100	2.7	510	0.82	93	1.5	40	0.65	29	0.55
Beryllium	ICAP	U	0.40	U	1.8	4.4	0.54	U	1.0	0.49	0.43	U	0.37
Cadmium	ICAP	U	0.50	6.3	2.2	U	0.68	U	1.2	U	0.54	U	0.46
Calcium	ICAP	U	50	40000	220	3700	68	14000	120	6600	54	1900	46
Chromium	ICAP	U	0.50	130	2.2	21	0.68	19	1.2	13	0.54	12	0.46
Cobalt	ICAP	U	0.50	8.2	2.2	17	0.68	9.9	1.2	6.6	0.54	5.8	0.46
Copper	ICAP	U	0.90	50	4.0	54	1.2	16	2.2	7.9	0.97	11	0.83
Iron	ICAP	U	9.0	17000	40	18000	12	21000	22	14000	9.7	16000	8.3
Lead	ICAP	U	4.0	390	18	20	5.4	16	10	12	4.3	10	3.7
Magnesium	ICAP	U	50	1400	220	930	68	2300	120	1400	54	880	46
Manganese	ICAP	U	0.50	470	2.2	100	0.68	670	1.2	280	0.54	210	0.46
Mercury	Cold Vapor	U	0.04	U	0.14	0.45	0.05	0.54	0.10	0.19	0.03	0.25	0.03
Nickel	ICAP	U	1.0	27	4.5	30	1.4	13	2.5	7.3	1.1	7.6	0.92
Potassium	ICAP	U	200	U	900	1900	270	1100	500	400	220	270	180
Selenium	AA-Fur	U	0.50	U	2.2	5.8	0.84	U	1.1	U	0.50	U	0.47
Silver	ICAP	U	0.50	U	2.2	U	0.68	U	1.2	U	0.54	U	0.46
Sodium	ICAP	U	50	740	220	320	68	140	120	340	54	130	46
Thallium	AA-Fur	U	0.50	U	2.2	1.7	0.84	U	1.1	U	0.50	U	0.47
Vanadium	ICAP	U	1.0	29	4.5	69	1.4	26	2.5	16	1.1	14	0.92
Zinc	ICAP	U	2.0	200000	45	110	2.7	69	5.0	49	2.2	87	1.8

Table 1.9 (Cont) Results of the Analysis for TAL Metals in Soil
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00404		11-215-00405		11-215-00406		11-215-00407		11-215-00605		11-215-00606	
Location		BMI-4		BMI-5		BMI-6		BMI-1		Sulfate Basin No.1		Emergency Pond	
% Solids		64		66		72		55		35		30	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	4100	13	4200	17	2800	15	5400	23	8300	28	7900	36
Antimony	ICAP	U	4.5	U	6.1	U	5.2	U	8.0	11	9.8	U	13
Arsenic	AA-Fur	4.3	0.57	4.6	0.51	1.3	0.47	6.0	0.56	7.5	0.86	8.6	0.93
Barium	ICAP	35	0.45	43	0.61	27	0.52	54	0.80	96	0.98	75	1.3
Beryllium	ICAP	0.44	0.30	0.50	0.41	U	0.35	0.62	0.53	0.79	0.66	U	0.84
Cadmium	ICAP	U	0.37	U	0.51	U	0.43	U	0.67	3.6	0.82	8.1	1.0
Calcium	ICAP	12000	37	3200	51	2300	43	7100	67	120000	82	96000	100
Chromium	ICAP	18	0.37	19	0.51	9.6	0.43	15	0.67	44	0.82	48	1.0
Cobalt	ICAP	6.9	0.37	7.7	0.51	5.0	0.43	7.9	0.67	11	0.82	12	1.0
Copper	ICAP	7.0	0.67	11	0.92	4.2	0.78	10	1.2	43	1.5	77	1.9
Iron	ICAP	17000	6.7	15000	9.2	12000	7.8	16000	12	17000	15	18000	19
Lead	ICAP	7.1	3.0	21	4.1	7.4	3.5	21	5.3	120	6.6	180	8.4
Magnesium	ICAP	1900	37	980	51	800	43	1600	67	4000	82	2900	100
Manganese	ICAP	360	0.37	390	0.51	130	0.43	570	0.67	690	0.82	690	1.0
Mercury	Cold Vapor	0.05	0.03	0.21	0.03	0.07	0.03	0.26	0.04	1.1	0.08	0.91	0.07
Nickel	ICAP	6.6	0.75	11	1.0	5.0	0.87	8.9	1.3	25	1.6	34	2.1
Potassium	ICAP	310	150	350	200	310	170	430	270	490	330	440	420
Selenium	AA-Fur	U	0.57	U	0.51	U	0.47	U	0.56	U	0.86	U	0.93
Silver	ICAP	U	0.37	U	0.51	U	0.43	U	0.67	U	0.82	U	1.0
Sodium	ICAP	U	37	63	51	U	43	130	67	1700	82	1600	100
Thallium	AA-Fur	U	0.57	U	0.51	U	0.47	U	0.56	U	0.86	U	0.93
Vanadium	ICAP	20	0.75	19	1.0	14	0.87	19	1.3	25	1.6	26	2.1
Zinc	ICAP	45	1.5	120	2.0	35	1.7	59	2.7	27000	3.3	44000	4.2

Table 1.9 (Cont) Results of the Analysis for TAL Metals in Soil
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00607		11-215-00608		11-215-00504		11-215-00505		11-215-00506		11-215-00507	
Location		Polishing Pond		Viscose Creek		PCB Area		Treatment Plant		Fly Ash Pile		Blank	
% Solids		27		62		81		80		60		100	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	17000	39	13000	20	13000	17	8600	20	13000	23	35	15
Antimony	ICAP	U	14	U	7.2	U	6.0	U	7.0	U	8.2	U	5.5
Arsenic	AA-Fur	9.5	1.1	15	0.48	15	0.51	3.7	1.2	75	0.65	U	0.50
Barium	ICAP	180	1.4	120	0.72	46	0.60	120	0.70	1100	0.82	U	0.55
Beryllium	ICAP	1.6	0.91	1.3	0.48	0.73	0.40	1.2	0.47	4.1	0.55	U	0.36
Cadmium	ICAP	10	1.1	0.82	0.60	0.92	0.50	U	0.59	U	0.69	U	0.45
Calcium	ICAP	41000	110	41000	60	19000	50	3000	59	1700	69	54	45
Chromium	ICAP	67	1.1	160	0.60	15	0.50	15	0.59	21	0.69	U	0.45
Cobalt	ICAP	23	1.1	24	0.60	11	0.50	17	0.59	15	0.69	U	0.45
Copper	ICAP	130	2.0	98	1.1	17	0.89	16	1.1	46	1.2	U	0.82
Iron	ICAP	38000	20	47000	11	25000	8.9	26000	11	36000	12	51	8.2
Lead	ICAP	140	9.1	180	4.8	32	4.0	25	4.7	15	5.5	U	3.6
Magnesium	ICAP	4000	110	1300	60	6100	50	1500	59	970	69	U	45
Manganese	ICAP	1400	1.1	960	0.60	49	0.50	1100	0.59	110	0.69	U	0.45
Mercury	Cold Vapor	1.1	0.12	0.39	0.02	U	0.02	0.34	0.04	0.60	0.05	U	0.03
Nickel	ICAP	53	2.3	120	1.2	19	0.99	13	1.2	30	1.4	U	0.91
Potassium	ICAP	1300	460	490	240	310	200	680	230	2600	270	U	180
Selenium	AA-Fur	U	1.1	1.0	0.48	U	0.51	U	0.58	6.3	0.65	U	0.50
Silver	ICAP	U	1.1	U	0.60	U	0.50	U	0.59	U	0.69	U	0.45
Sodium	ICAP	500	110	8600	60	U	50	310	59	360	69	U	45
Thallium	AA-Fur	U	1.1	U	0.48	U	0.51	U	0.58	1.6	0.65	U	0.50
Vanadium	ICAP	59	2.3	60	1.2	45	0.99	37	1.2	68	1.4	U	0.91
Zinc	ICAP	43000	4.6	470	2.4	410	2.0	710	2.3	36	2.7	U	1.8

Table 1.9 (Cont) Results of the Analysis for TAL Metals in Soil
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00410		11-215-00501		11-215-00502		11-215-00503	
Location		Reference No. 2		Reference		Wetland Area		Emergency Pond	
% Solids		56		85		81		72	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	14000	13	8200	11	16000	17	3300	19
Antimony	ICAP	U	4.6	U	4.0	U	6.0	U	6.7
Arsenic	AA-Fur	3.6	0.55	5.3	0.73	4.7	1.0	2.1	0.50
Barium	ICAP	120	0.46	49	0.40	59	0.60	29	0.67
Beryllium	ICAP	1.2	0.30	0.83	0.26	1.7	0.40	U	0.45
Cadmium	ICAP	U	0.38	U	0.33	U	0.50	U	0.56
Calcium	ICAP	5500	38	27000	33	2000	50	1200	56
Chromium	ICAP	24	0.38	15	0.33	16	0.50	9.2	0.56
Cobalt	ICAP	13	0.38	8.8	0.33	12	0.50	6.1	0.56
Copper	ICAP	22	0.69	14	0.59	42	0.89	6.1	1.0
Iron	ICAP	25000	6.9	25000	5.9	58000	8.9	12000	10
Lead	ICAP	22	3.0	20	2.6	27	4.0	9.1	4.5
Magnesium	ICAP	2300	38	11000	33	610	50	850	56
Manganese	ICAP	600	0.38	130	0.33	130	0.50	920	0.56
Mercury	Cold Vapor	0.87	0.05	U	0.04	0.07	0.04	0.25	0.03
Nickel	ICAP	15	0.76	12	0.66	18	0.99	5.9	1.1
Potassium	ICAP	870	150	430	130	340	200	330	220
Selenium	AA-Fur	U	0.55	U	0.37	U	0.52	U	0.50
Silver	ICAP	U	0.38	U	0.33	U	0.50	U	0.56
Sodium	ICAP	44	38	48	33	U	50	340	56
Thallium	AA-Fur	U	0.55	U	0.37	U	0.52	U	0.50
Vanadium	ICAP	36	0.76	38	0.66	40	0.99	12	1.1
Zinc	ICAP	78	1.5	110	1.3	57	2.0	53	2.2

Table 1.10 Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		Method Blank		CO2 Blank		11-215-00060		11-215-00061		11-215-00062		11-215-00063	
Location		Lab		051497		Sulfate Basin No 5		Sulfate Basin No 5		Sulfate Basin No 5		Sulfate Basin No 5	
% Solids		100		NA		19		20		23		20	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/ sample	MDL mg/ sample	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	U	5.0	0.0045	0.0025	24	20	U	13	90	15	350	19
Antimony	AA-Fur	U	0.20	U	0.0001	U	0.81	U	0.52	U	0.59	U	0.76
Arsenic	AA-Fur	U	0.20	U	0.0001	U	0.81	U	0.52	U	0.59	U	0.76
Barium	ICAP	U	0.30	0.00022	0.00015	23	1.2	11	0.78	31	0.88	27	1.1
Beryllium	ICAP	U	0.20	U	0.0001	U	0.81	U	0.52	U	0.59	U	0.76
Cadmium	ICAP	U	0.30	U	0.00015	U	1.2	U	0.78	U	0.88	U	1.1
Calcium	ICAP	U	10	0.048	0.005	59000	41	62000	26	81000	29	60000	38
Chromium	ICAP	U	0.50	0.002	0.00025	3.2	2.0	2.0	1.3	2.4	1.5	3.2	1.9
Cobalt	ICAP	U	0.50	U	0.00025	U	2.0	U	1.3	U	1.5	U	1.9
Copper	ICAP	U	0.50	U	0.00025	3.3	2.0	18	1.3	3	1.5	42	1.9
Iron	ICAP	U	2.5	0.017	0.0013	90	10	97	6.5	170	7.4	480	9.6
Lead	AA-Fur	U	0.20	0.0004	0.0001	U	0.81	U	0.52	U	0.59	2.3	0.76
Magnesium	ICAP	U	50	U	0.025	2000	200	2000	130	2200	150	2000	190
Manganese	ICAP	U	0.20	0.00014	0.0001	11	0.81	10	0.52	15	0.59	24	0.76
Mercury	Cold Vapor	U	0.04	U	0.00002	0.16	0.16	U	0.17	U	0.13	U	0.14
Nickel	ICAP	U	1.0	U	0.0005	U	4.1	U	2.6	U	2.9	U	3.8
Potassium	ICAP	U	200	U	0.10	12000	810	15000	520	10000	590	13000	760
Selenium	AA-Fur	U	0.20	U	0.0001	1.6	0.81	1.3	0.52	2.3	0.59	2.4	0.76
Silver	ICAP	U	0.50	U	0.00025	U	2.0	U	1.3	U	1.5	U	1.9
Sodium	ICAP	U	50	0.057	0.025	4800	200	4400	130	5300	150	6100	190
Thallium	AA-Fur	U	0.20	U	0.0001	U	0.81	U	0.52	U	0.59	U	0.76
Vanadium	ICAP	U	0.50	U	0.00025	U	2.0	U	1.3	U	1.5	2.1	1.9
Zinc	ICAP	U	0.50	0.00083	0.00025	420	2.0	300	1.3	420	1.5	1300	1.9

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00064		11-215-00065		11-215-00070		11-215-00071		11-215-00072		11-215-00073	
Location		Sulfate Basin No 5		Sulfate Basin No 5		Outfall 001		Outfall 001		Outfall 001		Outfall 00[illegible]	
% Solids		20		22		28		28		29		2[illegible]	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	U	19	U	19	U	14	U	14	U	17	U	15
Antimony	AA-Fur	U	0.78	U	0.76	U	0.56	U	0.57	U	0.67	U	0.58
Arsenic	AA-Fur	U	0.78	U	1.5	U	1.1	U	0.57	U	0.67	U	0.58
Barium	ICAP	6.9	1.2	9.4	1.1	2.6	0.84	2.9	0.85	2.7	1.0	3.7	0.88
Beryllium	ICAP	U	0.78	U	0.76	U	0.56	U	0.57	U	0.67	U	0.58
Cadmium	ICAP	U	1.2	U	1.1	U	0.84	U	0.85	U	1.0	U	0.88
Calcium	ICAP	28000	39	57000	38	34000	28	32000	28	39000	33	50000	29
Chromium	ICAP	U	1.9	2	1.9	U	1.4	U	1.4	2.1	1.7	U	1.5
Cobalt	ICAP	U	1.9	U	1.9	U	1.4	U	1.4	U	1.7	U	1.5
Copper	ICAP	4.4	1.9	6.3	1.9	10	1.4	1.5	1.4	17	1.7	U	1.5
Iron	ICAP	68	9.7	60	9.6	28	7.0	46	7.1	40	8.3	52	7.3
Lead	AA-Fur	U	0.78	U	0.76	U	0.56	U	0.57	U	0.67	U	0.58
Magnesium	ICAP	1500	190	1800	190	1100	140	1200	140	1300	170	1600	150
Manganese	ICAP	5.2	0.78	5.5	0.76	8.8	0.56	13	0.57	16	0.67	14	0.58
Mercury	Cold Vapor	U	0.2	0.19	0.19	0.69	0.13	0.74	0.14	0.67	0.13	1.0	0.17
Nickel	ICAP	U	3.9	U	3.8	U	2.8	U	2.8	U	3.3	U	2.9
Potassium	ICAP	14000	780	12000	760	9100	560	10000	570	10000	670	12000	580
Selenium	AA-Fur	1.7	0.78	1.4	0.76	1.1	0.56	1.1	0.57	1.3	0.67	1.4	0.58
Silver	ICAP	U	1.9	U	1.9	U	1.4	U	1.4	U	1.7	U	1.5
Sodium	ICAP	3500	190	4800	190	3600	140	3500	140	3400	170	4400	150
Thallium	AA-Fur	U	0.78	U	0.76	U	0.56	U	0.57	U	0.67	U	0.58
Vanadium	ICAP	U	1.9	U	1.9	U	1.4	U	1.4	U	1.7	U	1.5
Zinc	ICAP	280	1.9	300	1.9	50	1.4	63	1.4	61	1.7	86	1.5

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Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00074		11-215-00075		11-215-00076		11-215-00077		11-215-00080		11-215-00081	
Location		Outfall 001		Outfall 001		Outfall 001		Outfall 001		Reference		Reference	
% Solids		27		25		26		28		25		29	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	U	14	U	14	U	13	31	14	U	11	U	8.5
Antimony	AA-Fur	U	0.55	U	0.54	U	0.53	U	0.58	U	0.43	U	0.34
Arsenic	AA-Fur	U	0.55	U	0.54	U	0.53	U	0.58	U	0.43	U	0.34
Barium	ICAP	3.6	0.83	2.4	0.81	2.8	0.8	2.4	0.86	2.4	0.65	2.8	0.51
Beryllium	ICAP	U	0.55	U	0.54	U	0.53	U	0.58	U	0.43	U	0.34
Cadmium	ICAP	U	0.83	U	0.81	U	0.8	U	0.86	U	0.65	U	0.51
Calcium	ICAP	50000	28	43000	27	44000	27	38000	29	36000	22	32000	17
Chromium	ICAP	1.7	1.4	1.9	1.4	1.5	1.3	U	1.4	2.1	1.1	2.5	0.85
Cobalt	ICAP	U	1.4	U	1.4	U	1.3	U	1.4	U	1.1	U	0.85
Copper	ICAP	2.5	1.4	U	1.4	U	1.3	U	1.4	2.9	1.1	1.8	0.85
Iron	ICAP	28	6.9	39	6.8	42	6.7	79	7.2	46	5.4	47	4.3
Lead	AA-Fur	U	0.55	U	0.54	U	0.53	U	0.58	U	0.43	U	0.34
Magnesium	ICAP	1500	140	1500	140	1500	130	1400	140	1400	110	1300	85
Manganese	ICAP	21	0.55	11	0.54	13	0.53	21	0.58	9.6	0.43	13	0.34
Mercury	Cold Vapor	0.65	0.12	0.89	0.16	0.71	0.13	0.70	0.12	0.69	0.11	0.62	0.12
Nickel	ICAP	U	2.8	U	2.7	U	2.7	U	2.9	U	2.2	U	1.7
Potassium	ICAP	11000	550	12000	540	11000	530	12000	580	12000	430	11000	340
Selenium	AA-Fur	1.3	0.55	1.4	0.54	1.8	0.53	1.8	0.58	1.4	0.43	1.3	0.34
Silver	ICAP	U	1.4	U	1.4	U	1.3	U	1.4	U	1.1	U	0.85
Sodium	ICAP	3900	140	4000	140	3900	130	3900	140	4200	110	3200	85
Thallium	AA-Fur	U	0.55	U	0.54	U	0.53	U	0.58	U	0.43	U	0.34
Vanadium	ICAP	U	1.4	U	1.4	U	1.3	U	1.4	U	1.1	U	0.85
Zinc	ICAP	67	1.4	82	1.4	81	1.3	68	1.4	79	1.1	64	0.85

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID / Location / % Solids		11-215-00082 Reference 29		11-215-00083 Reference 27		11-215-00084 Reference 29		11-215-00085 Reference 29		11-215-00086 Reference 29		11-215-00087 R[illegible]e	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	U	8.7	U	10	12	10	U	11	U	14	U	13
Antimony	AA-Fur	U	0.35	U	0.42	U	0.42	U	0.45	U	0.54	U	0.52
Arsenic	AA-Fur	U	0.35	U	0.42	U	0.42	U	0.45	U	0.54	U	0.52
Barium	ICAP	3.0	0.52	3	0.63	3.5	0.63	3.3	0.67	2.8	0.82	3.8	0.79
Beryllium	ICAP	U	0.35	U	0.42	U	0.42	U	0.45	U	0.54	U	0.52
Cadmium	ICAP	U	0.52	U	0.63	U	0.63	U	0.67	U	0.82	U	0.79
Calcium	ICAP	40000	17	35000	21	35000	21	42000	22	36000	27	34000	26
Chromium	ICAP	1.2	0.87	1.3	1.0	U	1.0	1.6	1.1	1.4	1.4	U	1.3
Cobalt	ICAP	U	0.87	U	1.0	U	1.0	U	1.1	U	1.4	U	1.3
Copper	ICAP	1.2	0.87	1.4	1.0	1.8	1.0	1.7	1.1	1.5	1.4	U	1.3
Iron	ICAP	32	4.4	36	5.2	38	5.2	40	5.6	32	6.8	24	6.6
Lead	AA-Fur	U	0.35	U	0.42	U	0.42	0.49	0.45	U	0.54	U	0.52
Magnesium	ICAP	1400	87	1300	100	1200	100	1400	110	1300	140	1200	130
Manganese	ICAP	13	0.35	11	0.42	25	0.42	15	0.45	12	0.54	17	0.52
Mercury	Cold Vapor	0.97	0.13	0.74	0.14	0.66	0.13	0.51	0.11	0.81	0.12	0.55	0.1[illegible]
Nickel	ICAP	U	1.7	U	2.1	U	2.1	U	2.2	U	2.7	U	2.6
Potassium	ICAP	11000	350	10000	420	9900	420	10000	450	9900	540	8900	520
Selenium	AA-Fur	1.2	0.35	1.3	0.42	1.4	0.42	1.1	0.45	1.1	0.54	1.0	0.52
Silver	ICAP	U	0.87	U	1.0	U	1.0	U	1.1	U	1.4	U	1.3
Sodium	ICAP	3500	87	3500	100	3100	100	3600	110	3200	140	2900	130
Thallium	AA-Fur	U	0.35	U	0.42	U	0.42	U	0.45	U	0.54	U	0.52
Vanadium	ICAP	U	0.87	U	1.0	U	1.0	U	1.1	U	1.4	U	1.3
Zinc	ICAP	73	0.87	74	1.0	54	1.0	71	1.1	60	1.4	61	1.3

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Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		Method Blank		11-215-00201		11-215-00202		11-215-00203		11-215-00204		11-215-00205	
Location		Lab		TP-6-9		REF.-5-19		REF.-2-11		WA-?-?**		TP-3-19	
% Solids		100		27		30		26		30		27	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	U	5.0	63	16	280	16	29	15	47	14	53	13
Antimony	AA-Fur	U	0.20	U	0.65	U	0.65	U	0.62	U	0.57	U	0.52
Arsenic	AA-Fur	U	0.20	U	0.65	U	0.65	U	0.62	U	0.57	U	0.52
Barium	ICAP	U	0.30	8.1	0.98	8.7	0.98	22	0.93	5	0.86	14	0.78
Beryllium	ICAP	U	0.20	U	0.65	U	0.65	U	0.62	U	0.57	U	0.52
Cadmium	ICAP	U	0.30	U	0.98	1.0	0.98	U	0.93	U	0.86	U	0.78
Calcium	ICAP	U	10	42000	33	35000	33	26000	31	12000	29	52000	26
Chromium	ICAP	U	0.50	2.3	1.6	2.6	1.6	1.6	1.5	2.5	1.4	2.8	1.3
Cobalt	ICAP	U	0.50	U	1.6	1.8	1.6	U	1.5	U	1.4	U	1.3
Copper	ICAP	U	0.50	7.2	1.6	10	1.6	7.4	1.5	13	1.4	6.6	1.3
Iron	ICAP	U	2.5	290	8.1	700	8.2	230	7.7	250	7.1	260	6.5
Lead	AA-Fur	U	0.20	U	0.65	1.2	0.65	U	0.62	U	0.57	2.9	0.52
Magnesium	ICAP	U	50	1800	160	1200	160	1300	150	1100	140	1600	130
Manganese	ICAP	U	0.20	6.3	0.65	23	0.65	13	0.62	12	0.57	4.3	0.52
Mercury	Cold Vapor	U	0.04	U	0.17	0.23	0.15	U	0.18	U	0.12	U	0.17
Nickel	ICAP	U	1.0	U	3.3	U	3.3	U	3.1	U	2.9	U	2.6
Potassium	ICAP	U	200	10000	650	9300	650	11000	620	9100	570	11000	520
Selenium	AA-Fur	U	0.20	U	0.65	2.4	0.65	U	0.62	1.6	0.57	U	0.52
Silver	ICAP	U	0.50	U	1.6	U	1.6	U	1.5	U	1.4	U	1.3
Sodium	ICAP	U	50	4500	160	4400	160	4200	150	4000	140	4800	130
Thallium	AA-Fur	U	0.20	U	0.65	U	0.65	U	0.62	U	0.57	U	0.52
Vanadium	ICAP	U	0.50	U	1.6	U	1.6	U	1.5	U	1.4	U	1.3
Zinc	ICAP	U	0.50	94	1.6	180	1.6	91	1.5	92	1.4	100	1.3

** On chain of custody 1-215-006 the location of sample 11-215-00204 is listed as "WA-?-?".

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00206		11-215-00207		11-215-00208		11-215-00209		11-215-00210		11-215-00211	
Location		FA-10-8		FA-10-10		WA-A-50		REF-6-1		REF-6-7		R[illegible]8	
% Solids		31		24		29		30		29		[illegible]	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	120	14	100	16	91	11	94	9.7	110	9.7	130	12
Antimony	AA-Fur	U	0.55	U	0.66	U	0.45	U	0.39	U	0.39	U	0.48
Arsenic	AA-Fur	U	0.55	0.72	0.66	0.59	0.45	U	0.39	U	0.39	U	0.48
Barium	ICAP	38	0.82	15	0.99	4.1	0.68	5.2	0.58	5.2	0.58	32	0.72
Beryllium	ICAP	U	0.55	U	0.66	U	0.45	U	0.39	U	0.39	U	0.48
Cadmium	ICAP	U	0.82	U	0.99	0.96	0.68	U	0.58	0.73	0.58	U	0.72
Calcium	ICAP	33000	27	45000	33	29000	23	40000	19	30000	19	30000	24
Chromium	ICAP	3.1	1.4	3.3	1.6	1.5	1.1	2.5	0.97	2.8	0.97	1.9	1.[illegible]
Cobalt	ICAP	U	1.4	U	1.6	U	1.1	U	0.97	U	0.97	U	1.[illegible]
Copper	ICAP	8.4	1.4	8.6	1.6	11	1.1	9.3	0.97	10	0.97	7.7	1.[illegible]
Iron	ICAP	370	6.8	300	8.2	440	5.7	350	4.8	450	4.8	280	[illegible]
Lead	AA-Fur	U	0.55	U	0.66	5.6	0.45	1.3	0.39	1.2	0.39	U	0.4[illegible]
Magnesium	ICAP	1400	140	1900	160	1000	110	1200	97	1000	97	1600	12[illegible]
Manganese	ICAP	4.5	0.55	6.4	0.66	11	0.45	5.9	0.39	6.9	0.39	38	0.4[illegible]
Mercury	Cold Vapor	U	0.11	U	0.18	0.24	0.1	0.26	0.13	0.21	0.14	U	0.1[illegible]
Nickel	ICAP	U	2.7	U	3.3	U	2.3	U	1.9	U	1.9	U	2.[illegible]
Potassium	ICAP	9400	550	13000	660	8700	450	8400	390	8400	390	12000	48[illegible]
Selenium	AA-Fur	4.9	0.55	3.9	0.66	3.8	0.45	1.9	0.39	2.2	0.39	U	0.4[illegible]
Silver	ICAP	U	1.4	U	1.6	U	1.1	U	0.97	U	0.97	U	1.[illegible]
Sodium	ICAP	3600	140	4200	160	4500	110	4300	97	4600	97	4200	12[illegible]
Thallium	AA-Fur	U	0.55	U	0.66	U	0.45	U	0.39	U	0.39	U	0.4[illegible]
Vanadium	ICAP	U	1.4	U	1.6	U	1.1	U	0.97	U	0.97	U	1.[illegible]
Zinc	ICAP	95	1.4	100	1.6	130	1.1	140	0.97	130	0.97	81	1.[illegible]

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00212		11-215-00213		11-215-00214		11-215-00215		11-215-00216		11-215-00217	
Location		REF-2-10		REF-5-10		REF-1-17		REF-4-17		REF-5-9		FA-10-8	
% Solids		25		31		32		26		29		27	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	46	19	110	15	290	9.8	260	10	140	13	260	15
Antimony	AA-Fur	U	0.76	U	0.60	U	0.39	U	0.40	U	0.52	U	0.59
Arsenic	AA-Fur	U	0.76	U	0.60	0.49	0.39	0.49	0.40	0.55	0.52	1.1	0.59
Barium	ICAP	46	1.1	21	0.89	12	0.59	14	0.61	3.9	0.78	38	0.89
Beryllium	ICAP	U	0.76	U	0.60	U	0.39	U	0.40	U	0.52	U	0.59
Cadmium	ICAP	U	1.1	U	0.89	0.74	0.59	U	0.61	1.6	0.78	U	0.89
Calcium	ICAP	23000	38	56000	30	26000	20	31000	20	31000	26	39000	30
Chromium	ICAP	2.2	1.9	2.1	1.5	4.0	0.98	2.2	1.0	2.1	1.3	3.1	1.5
Cobalt	ICAP	U	1.9	U	1.5	U	0.98	U	1.0	1.8	1.3	U	1.5
Copper	ICAP	8.9	1.9	12	1.5	13	0.98	15	1.0	11	1.3	11	1.5
Iron	ICAP	210	9.5	390	7.5	730	4.9	760	5.1	410	6.5	520	7.4
Lead	AA-Fur	U	0.76	13	0.60	1.3	0.39	0.77	0.40	2.1	0.52	U	0.59
Magnesium	ICAP	1500	190	1500	150	1200	98	1100	100	1100	130	1600	150
Manganese	ICAP	34	0.76	6.1	0.60	46	0.39	19	0.40	9.1	0.52	7.7	0.59
Mercury	Cold Vapor	U	0.15	0.49	0.12	0.21	0.11	0.21	0.14	0.27	0.13	U	0.15
Nickel	ICAP	U	3.8	U	3.0	U	2.0	U	2.0	U	2.6	U	3
Potassium	ICAP	12000	760	8900	600	8000	390	8900	400	8800	520	11000	590
Selenium	AA-Fur	U	0.76	1.5	0.60	2.3	0.39	2.2	0.40	2.5	0.52	3.3	0.59
Silver	ICAP	U	1.9	U	1.5	U	0.98	U	1.0	U	1.3	U	1.5
Sodium	ICAP	3900	190	4300	150	4000	98	5100	100	4500	130	4000	150
Thallium	AA-Fur	U	0.76	U	0.60	U	0.39	U	0.40	U	0.52	U	0.59
Vanadium	ICAP	U	1.9	U	1.5	0.98	0.98	1.1	1.0	U	1.3	2.2	1.5
Zinc	ICAP	83	1.9	140	1.5	140	0.98	130	1.0	240	1.3	120	1.5

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID	11-215-00218
Location	FA-10-9
% Solids	32

Parameter	Analysis Method	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	250	13
Antimony	AA-Fur	U	0.51
Arsenic	AA-Fur	0.87	0.51
Barium	ICAP	24	0.77
Beryllium	ICAP	U	0.51
Cadmium	ICAP	U	0.77
Calcium	ICAP	22000	26
Chromium	ICAP	1.6	1.3
Cobalt	ICAP	U	1.3
Copper	ICAP	6.5	1.3
Iron	ICAP	490	6.4
Lead	AA-Fur	U	0.51
Magnesium	ICAP	1100	130
Manganese	ICAP	9.9	0.51
Mercury	Cold Vapor	U	0.14
Nickel	ICAP	U	2.6
Potassium	ICAP	8100	510
Selenium	AA-Fur	2.2	0.51
Silver	ICAP	U	1.3
Sodium	ICAP	3700	130
Thallium	AA-Fur	U	0.51
Vanadium	ICAP	1.7	1.3
Zinc	ICAP	74	1.3

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		Method Blank		11-215-00232		11-215-00233		11-215-00234		11-215-00235		11-215-00236	
Location		Lab		TP-1-1		TP-2-2		REF-6-9		WA-NORTH-20		WA-SOUTH-17	
% Solids		100		30		28		24		35		29	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	U	5.0	72	15	71	15	48	26	58	13	76	14
Antimony	AA-Fur	U	0.20	U	0.59	U	0.61	U	1.1	U	0.50	U	0.55
Arsenic	AA-Fur	U	0.20	U	0.59	U	0.61	U	1.1	U	0.60	U	0.55
Barium	ICAP	U	0.30	9.8	0.89	3.3	0.92	29	1.6	7.5	0.76	9.1	0.82
Beryllium	ICAP	U	0.20	U	0.59	U	0.61	U	1.1	U	0.50	U	0.55
Cadmium	ICAP	U	0.30	U	0.89	U	0.92	U	1.6	U	0.76	U	0.82
Calcium	ICAP	U	10	49000	30	32000	31	23000	53	23000	25	29000	27
Chromium	ICAP	U	0.50	U	1.5	2.1	1.5	U	2.6	U	1.3	1.6	1.4
Cobalt	ICAP	U	0.50	U	1.5	U	1.5	U	2.6	U	1.3	U	1.4
Copper	ICAP	U	0.50	7.2	1.5	8.4	1.5	20	2.6	7.6	1.3	10	1.4
Iron	ICAP	U	2.5	290	7.4	240	7.7	250	13	230	6.3	280	6.8
Lead	AA-Fur	0.26	0.20	U	0.59	U	0.61	U	1.1	14	0.50	U	0.55
Magnesium	ICAP	U	50	1700	150	1400	150	1300	260	1100	130	1300	140
Manganese	ICAP	U	0.20	6.0	0.59	6.2	0.61	22	1.1	6.6	0.50	12	0.55
Mercury	Cold Vapor	U	0.04	U	0.14	U	0.14	U	0.17	0.08	0.08	U	0.15
Nickel	ICAP	U	1.0	U	3.0	U	3.1	U	5.3	U	2.5	U	2.7
Potassium	ICAP	U	200	11000	590	9900	610	11000	1100	7800	500	9900	550
Selenium	AA-Fur	U	0.20	U	0.59	U	0.61	U	1.1	1.2	0.50	1.1	0.55
Silver	ICAP	U	0.50	U	1.5	U	1.5	U	2.6	U	1.3	U	1.4
Sodium	ICAP	U	50	4100	150	3800	150	4400	260	3700	130	4300	140
Thallium	AA-Fur	U	0.20	U	0.59	U	0.61	U	1.1	U	0.50	U	0.55
Vanadium	ICAP	U	0.50	U	1.5	U	1.5	U	2.6	U	1.3	U	1.4
Zinc	ICAP	U	0.50	110	1.5	90	1.5	86	2.6	93	1.3	120	1.4

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00090		11-215-00091		11-215-00092		11-215-00093		11-215-00094		11-215-00095	
Location		OUTFALL 002		OUTFALL 002		OUTFALL 002		OUTFALL 002		OUTFALL 002		OU[illegible]00	
% Solids		27		28		26		27		28			
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	43	12	25	15	23	18	U	14	31	14	U	1
Antimony	AA-Fur	U	0.48	U	0.59	U	0.71	U	0.57	U	0.56	U	0.7
Arsenic	AA-Fur	U	0.48	U	0.59	U	0.71	U	0.57	U	0.56	U	0.7
Barium	ICAP	3.4	0.72	2.7	0.88	4	1.1	2.1	0.85	1.8	0.84	6.7	1.
Beryllium	ICAP	U	0.48	U	0.59	U	0.71	U	0.57	U	0.56	U	0.7
Cadmium	ICAP	U	0.72	U	0.88	U	1.1	U	0.85	U	0.84	U	1.
Calcium	ICAP	34000	24	41000	29	41000	35	38000	28	34000	28	50000	3
Chromium	ICAP	U	1.2	U	1.5	U	1.8	2.7	1.4	2.5	1.4	U	1.
Cobalt	ICAP	U	1.2	U	1.5	U	1.8	U	1.4	U	1.4	U	1.
Copper	ICAP	4.1	1.2	1.6	1.5	2.5	1.8	2.3	1.4	1.8	1.4	2.9	1
Iron	ICAP	92	6.0	46	7.4	37	8.8	64	7.1	51	7.0	54	9
Lead	AA-Fur	U	0.48	U	0.59	U	0.71	U	0.57	U	0.56	U	0.7
Magnesium	ICAP	1400	120	1400	150	1400	180	1400	140	1300	140	1600	19
Manganese	ICAP	22	0.48	22	0.59	22	0.71	16	0.57	13	0.56	17	0.7
Mercury	Cold Vapor	0.82	0.16	0.95	0.14	0.81	0.16	0.85	0.11	0.8	0.16	0.89	0.1
Nickel	ICAP	U	2.4	U	2.9	U	3.5	U	2.8	U	2.8	U	3
Potassium	ICAP	12000	480	10000	590	11000	710	11000	570	10000	560	12000	75
Selenium	AA-Fur	1.2	0.48	1.3	0.59	1	0.71	1.3	0.57	1.2	0.56	1.3	0.7
Silver	ICAP	U	1.2	U	1.5	U	1.8	U	1.4	U	1.4	U	1
Sodium	ICAP	3400	120	3500	150	3700	180	3600	140	3300	140	4500	19
Thallium	AA-Fur	U	0.48	U	0.59	U	0.71	U	0.57	U	0.56	U	0.7
Vanadium	ICAP	U	1.2	U	1.5	U	1.8	U	1.4	U	1.4	U	1
Zinc	ICAP	58	1.2	73	1.5	67	1.8	77	1.4	60	1.4	90	1

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00096		11-215-00097		11-215-00100		11-215-00101		11-215-00102		11-215-00103	
Location		OUTFALL 002		OUTFALL 002		OUTFALL 004		OUTFALL 004		OUTFALL 004		OUTFALL 004	
% Solids		28		27		28		26		26		25	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	15	8.3	U	17	21	16	26	14	69	17	40	16
Antimony	AA-Fur	U	0.33	U	0.67	U	0.64	U	0.56	U	0.69	U	0.62
Arsenic	AA-Fur	U	0.33	U	0.67	U	0.64	U	0.56	U	0.69	U	0.62
Barium	ICAP	3.5	0.5	2.9	1.0	3.2	0.97	6.5	0.83	1.9	1.0	3.8	0.93
Beryllium	ICAP	U	0.33	U	0.67	U	0.64	U	0.56	U	0.69	U	0.62
Cadmium	ICAP	U	0.5	U	1.0	U	0.97	U	0.83	U	1.0	U	0.93
Calcium	ICAP	31000	17	37000	33	31000	32	48000	28	28000	34	34000	31
Chromium	ICAP	1.5	0.83	U	1.7	U	1.6	2.3	1.4	U	1.7	U	1.6
Cobalt	ICAP	U	0.83	U	1.7	U	1.6	U	1.4	U	1.7	U	1.6
Copper	ICAP	3.7	0.83	2.3	1.7	3.1	1.6	2.4	1.4	2.6	1.7	2.2	1.6
Iron	ICAP	34	4.2	59	8.3	33	8.0	70	6.9	82	8.6	65	7.8
Lead	AA-Fur	U	0.33	U	0.67	U	0.64	U	0.56	0.96	0.69	U	0.62
Magnesium	ICAP	1200	83	1300	170	1200	160	1400	140	1300	170	1400	160
Manganese	ICAP	16	0.33	18	0.67	11	0.64	32	0.56	9.0	0.69	14	0.62
Mercury	Cold Vapor	0.72	0.09	0.66	0.13	1.00	0.13	0.58	0.12	0.89	0.14	0.64	0.14
Nickel	ICAP	U	1.7	U	3.3	U	3.2	U	2.8	U	3.4	U	3.1
Potassium	ICAP	11000	330	11000	670	10000	640	9100	560	11000	690	11000	620
Selenium	AA-Fur	0.93	0.33	1.2	0.67	0.82	0.64	1.1	0.56	1.1	0.69	0.86	0.62
Silver	ICAP	U	0.83	U	1.7	U	1.6	U	1.4	U	1.7	U	1.6
Sodium	ICAP	3200	83	3800	170	3000	160	4900	140	3000	170	3200	160
Thallium	AA-Fur	U	0.33	U	0.67	U	0.64	U	0.56	U	0.69	U	0.62
Vanadium	ICAP	U	0.83	U	1.7	U	1.6	U	1.4	U	1.7	U	1.6
Zinc	ICAP	62	0.83	82	1.7	61	1.6	91	1.4	62	1.7	70	1.6

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00104		11-215-00105		11-215-00106		11-215-00107		11-215-00110		11-215-0011[illegible]	
Location		OUTFALL 004		OUTFALL 004		OUTFALL 004		OUTFALL 004		DOWNSTREAM		DO[illegible]REA	
% Solids		26		26		27		26		28		[illegible]	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/k
Aluminum	ICAP	47	18	43	14	50	13	U	12	26	15	15	1
Antimony	AA-Fur	U	0.71	U	0.57	U	0.50	U	0.49	U	0.59	U	0.5
Arsenic	AA-Fur	U	0.71	U	0.57	U	0.50	U	0.49	U	0.59	U	0.5
Barium	ICAP	6.2	1.1	4.4	0.86	5.6	0.76	2.5	0.74	2.2	0.88	2.9	0.7
Beryllium	ICAP	U	0.71	U	0.57	U	0.50	U	0.49	U	0.59	U	0.5
Cadmium	ICAP	U	1.1	U	0.86	U	0.76	U	0.74	U	0.88	U	0.7
Calcium	ICAP	41000	36	55000	29	42000	25	40000	25	35000	29	51000	[illegible]
Chromium	ICAP	2.2	1.8	U	1.4	1.9	1.3	1.5	1.2	U	1.5	1.5	1
Cobalt	ICAP	U	1.8	U	1.4	U	1.3	U	1.2	U	1.5	U	1
Copper	ICAP	5.4	1.8	3.3	1.4	2.0	1.3	1.9	1.2	4	1.5	2.5	1
Iron	ICAP	83	8.9	82	7.1	65	6.3	53	6.1	55	7.3	41	6
Lead	AA-Fur	U	0.71	U	0.57	U	0.50	U	0.49	U	0.59	U	0.5
Magnesium	ICAP	1400	180	1600	140	1400	130	1400	120	1200	150	1800	1
Manganese	ICAP	18	0.71	16	0.57	17	0.50	13	0.49	10	0.59	30	0.5
Mercury	Cold Vapor	0.54	0.15	0.64	0.14	0.72	0.12	0.70	0.12	0.71	0.09	0.73	0.
Nickel	ICAP	U	3.6	U	2.9	U	2.5	U	2.5	U	2.9	U	2
Potassium	ICAP	11000	710	10000	570	10000	500	9700	490	9200	590	13000	5.
Selenium	AA-Fur	0.71	0.71	1.2	0.57	0.64	0.50	1.0	0.49	1.7	0.59	1.3	0.
Silver	ICAP	U	1.8	U	1.4	U	1.3	U	1.2	U	1.5	U	1
Sodium	ICAP	3500	180	4100	140	3700	130	4000	120	3600	150	3800	1
Thallium	AA-Fur	U	0.71	U	0.57	U	0.50	U	0.49	U	0.59	U	0.
Vanadium	ICAP	U	1.8	U	1.4	U	1.3	U	1.2	U	1.5	U	[illegible]
Zinc	ICAP	67	1.8	87	1.4	84	1.3	79	1.2	66	1.5	86	[illegible]

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Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00112		11-215-00113		11-215-00114		11-215-00115		11-215-00116		11-215-00117	
Location		DOWNSTREAM		DOWNSTREAM		DOWNSTREAM		DOWNSTREAM		DOWNSTREAM		DOWNSTREAM	
% Solids		27		29		26		23		25		24	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	26	19	U	18	U	9.3	14	11	U	10	U	12
Antimony	AA-Fur	U	0.78	U	0.73	U	0.37	U	0.45	U	0.41	U	0.48
Arsenic	AA-Fur	U	0.78	U	0.73	U	0.37	U	0.45	U	0.41	U	0.48
Barium	ICAP	2.8	1.2	1.7	1.1	3.2	0.56	3.3	0.68	1.5	0.61	3.6	0.72
Beryllium	ICAP	U	0.78	U	0.73	U	0.37	U	0.45	U	0.41	U	0.48
Cadmium	ICAP	U	1.2	U	1.1	U	0.56	U	0.68	U	0.61	U	0.72
Calcium	ICAP	41000	39	38000	36	51000	19	43000	23	31000	20	53000	24
Chromium	ICAP	U	1.9	U	1.8	1.5	0.93	1.8	1.1	1.2	1.0	1.5	1.2
Cobalt	ICAP	U	1.9	U	1.8	U	0.93	U	1.1	U	1.0	U	1.2
Copper	ICAP	2.8	1.9	1.8	1.8	3	0.93	1.5	1.1	5.8	1.0	3.3	1.2
Iron	ICAP	48	9.7	32	9.1	49	4.7	23	5.7	35	5.1	63	6.0
Lead	AA-Fur	U	0.78	U	0.73	U	0.37	U	0.45	U	0.41	U	0.48
Magnesium	ICAP	1400	190	1400	180	1500	93	1600	110	1400	100	1800	120
Manganese	ICAP	22	0.78	11	0.73	28	0.37	19	0.45	10	0.41	22	0.48
Mercury	Cold Vapor	0.81	0.16	0.44	0.15	0.62	0.11	0.85	0.13	0.6	0.13	1.0	0.10
Nickel	ICAP	U	3.9	U	3.6	U	1.9	U	2.3	U	2.0	U	2.4
Potassium	ICAP	11000	780	11000	730	11000	370	14000	450	12000	410	12000	480
Selenium	AA-Fur	1.4	0.78	1.6	0.73	1.2	0.37	1.1	0.45	1.1	0.41	0.86	0.48
Silver	ICAP	U	1.9	U	1.8	U	0.93	U	1.1	U	1.0	U	1.2
Sodium	ICAP	3500	190	3700	180	4500	93	3600	110	3300	100	4500	120
Thallium	AA-Fur	U	0.78	U	0.73	U	0.37	U	0.45	U	0.41	U	0.48
Vanadium	ICAP	U	1.9	U	1.8	U	0.93	U	1.1	U	1.0	U	1.2
Zinc	ICAP	67	1.9	82	1.8	100	0.93	71	1.1	66	1.0	99	1.2

(U denotes less than the MDL (not detected))

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		Method Blank		11-215-00066		11-215-00219		11-215-00220		11-215-00221		11-215-00222	
Location		Lab		Sulfate Basin No 5		FA-10-8		REF-1-8		REF-1-17		F[illegible]	
% Solids		100		23		34		28		25		[illegible]	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	U	5.0	88	19	98	12	120	12	290	17	26	14
Antimony	AA-Fur	U	0.20	U	0.74	U	0.48	U	0.46	U	0.68	U	0.55
Arsenic	AA-Fur	U	0.20	U	0.74	U	0.48	U	0.46	U	0.68	U	0.55
Barium	ICAP	U	0.30	18	1.1	14	0.72	5.8	0.69	42	1.0	13	0.82
Beryllium	ICAP	U	0.20	U	0.74	U	0.48	U	0.46	U	0.68	U	0.55
Cadmium	ICAP	U	0.30	U	1.1	U	0.72	0.73	0.69	U	1.0	U	0.82
Calcium	ICAP	U	10	58000	37	17000	24	40000	23	26000	34	18000	27
Chromium	ICAP	U	0.50	2.5	1.9	U	1.2	2.5	1.2	2.8	1.7	1.5	1.4
Cobalt	ICAP	U	0.50	U	1.9	U	1.2	U	1.2	U	1.7	U	1.4
Copper	ICAP	U	0.50	2.0	1.9	6.5	1.2	10	1.2	9.9	1.7	12	1.4
Iron	ICAP	U	2.5	150	9.3	260	6	400	5.8	400	8.5	300	6.8
Lead	AA-Fur	U	0.20	U	0.74	U	0.48	1.3	0.46	U	0.68	U	0.55
Magnesium	ICAP	U	50	1700	190	960	120	1300	120	1600	170	1400	140
Manganese	ICAP	U	0.20	11	0.74	7.0	0.48	8.1	0.46	39	0.68	11	0.55
Mercury	Cold Vapor	U	0.04	U	0.17	U	0.09	0.22	0.11	U	0.16	U	0.14
Nickel	ICAP	U	1.0	U	3.7	U	2.4	U	2.3	U	3.4	U	2.7
Potassium	ICAP	U	200	11000	740	7200	480	9400	460	12000	680	13000	550
Selenium	AA-Fur	U	0.20	1.0	0.74	3.1	0.48	2.5	0.46	U	0.68	5.9	0.55
Silver	ICAP	U	0.50	U	1.9	U	1.2	U	1.2	U	1.7	U	1.4
Sodium	ICAP	U	50	4800	190	3100	120	4600	120	3900	170	4100	140
Thallium	AA-Fur	U	0.20	U	0.74	U	0.48	U	0.46	U	0.68	U	0.55
Vanadium	ICAP	U	0.50	U	1.9	U	1.2	U	1.2	U	1.7	U	1.4
Zinc	ICAP	U	0.50	360	1.9	67	1.2	160	1.2	78	1.7	93	1.4

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00223		11-215-00224		11-215-00225		11-215-00226		11-215-00227		11-215-00228	
Location		FA-10-9		REF-5-20		REF-5-19		REF-2-12		FA-10-10		FA-11-2	
% Solids		29		27		30		26		28		26	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	180	12	100	13	210	9.6	45	15	240	11	170	16
Antimony	AA-Fur	U	0.50	U	0.53	U	0.38	U	0.58	U	0.45	U	0.66
Arsenic	AA-Fur	0.97	0.50	U	0.53	0.46	0.38	U	0.58	0.83	0.45	U	0.66
Barium	ICAP	33	0.74	25	0.79	6.1	0.58	36	0.87	36	0.68	19	0.99
Beryllium	ICAP	U	0.50	U	0.53	U	0.38	U	0.58	U	0.45	U	0.66
Cadmium	ICAP	U	0.74	U	0.79	U	0.58	U	0.87	U	0.68	U	0.99
Calcium	ICAP	25000	25	21000	26	19000	19	26000	29	38000	23	26000	33
Chromium	ICAP	2.1	1.2	1.8	1.3	1.1	0.96	1.6	1.5	3.1	1.1	2.6	1.6
Cobalt	ICAP	U	1.2	U	1.3	U	0.96	U	1.5	U	1.1	U	1.6
Copper	ICAP	11	1.2	9.8	1.3	15	0.96	8.4	1.5	7.9	1.1	8.7	1.6
Iron	ICAP	380	6.2	270	6.6	560	4.8	190	7.3	620	5.6	450	8.2
Lead	AA-Fur	U	0.50	10	0.53	0.81	0.38	U	0.58	U	0.45	U	0.66
Magnesium	ICAP	1300	120	1500	130	830	96	1400	150	1600	110	1600	160
Manganese	ICAP	7.5	0.50	50	0.53	13	0.38	25	0.58	7.2	0.45	8.3	0.66
Mercury	Cold Vapor	U	0.11	U	0.13	0.15	0.10	U	0.13	U	0.12	U	0.15
Nickel	ICAP	U	2.5	U	2.6	U	1.9	U	2.9	U	2.3	U	3.3
Potassium	ICAP	11000	500	12000	530	7500	380	11000	580	11000	450	13000	660
Selenium	AA-Fur	2.9	0.50	U	0.53	1.4	0.38	U	0.58	2.9	0.45	4.2	0.66
Silver	ICAP	U	1.2	U	1.3	U	0.96	U	1.5	U	1.1	U	1.6
Sodium	ICAP	3300	120	4200	130	4000	96	3600	150	4200	110	3600	160
Thallium	AA-Fur	U	0.50	U	0.53	U	0.38	U	0.58	U	0.45	U	0.66
Vanadium	ICAP	1.4	1.2	U	1.3	U	0.96	U	1.5	1.2	1.1	U	1.6
Zinc	ICAP	96	1.2	84	1.3	97	0.96	76	1.5	100	1.1	100	1.6

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00229		11-215-00230		11-215-00231		11-215-00130		11-215-00131		11-215-00132	
Location		REF-6-10		FA-10-18		TP-1-2		Reference		Reference		[illegible]	
% Solids		30		26		30		15		16		[illegible]	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	120	11	440	16	120	13	470	20	880	20	56	1
Antimony	AA-Fur	U	0.42	U	0.64	U	0.51	U	0.80	U	0.78	U	0.6
Arsenic	AA-Fur	0.44	0.42	0.99	0.64	U	0.51	2.9	0.80	3.4	0.78	3.4	0.6
Barium	ICAP	4.6	0.63	25	0.96	6	0.77	11	1.2	12	1.2	4.6	0.9
Beryllium	ICAP	U	0.42	U	0.64	U	0.51	U	0.80	U	0.78	U	0.6
Cadmium	ICAP	1.2	0.63	U	0.96	U	0.77	U	1.2	U	1.2	U	0.9
Calcium	ICAP	31000	21	35000	32	35000	26	4200	40	3000	39	1700	3
Chromium	ICAP	2.5	1.1	3.4	1.6	2.4	1.3	2.5	2.0	2.9	2.0	1.7	1
Cobalt	ICAP	U	1.1	U	1.6	U	1.3	U	2.0	U	2.0	U	1
Copper	ICAP	9.5	1.1	22	1.6	6.3	1.3	44	2.0	30	2.0	35	1
Iron	ICAP	310	5.3	1100	8	260	6.4	1100	10	970	9.8	240	8
Lead	AA-Fur	1.1	0.42	U	0.64	U	0.51	0.92	0.80	0.78	0.78	U	0.6
Magnesium	ICAP	1100	110	1900	160	1400	130	950	200	690	200	700	17
Manganese	ICAP	7.4	0.42	12	0.64	6.5	0.51	43	0.80	32	0.78	13	0.6
Mercury	Cold Vapor	0.15	0.10	U	0.14	U	0.10	1.0	0.20	0.85	0.19	0.73	0.1
Nickel	ICAP	U	2.1	U	3.2	U	2.6	U	4.0	U	3.9	U	3
Potassium	ICAP	8900	420	13000	640	9400	510	2700	800	2100	780	2000	66
Selenium	AA-Fur	2.4	0.42	4.9	0.64	U	0.51	1.9	0.80	2.5	0.78	2.6	0.6
Silver	ICAP	U	1.1	U	1.6	U	1.3	U	2.0	U	2.0	U	1
Sodium	ICAP	4400	110	4000	160	3700	130	2100	200	1600	200	1800	17
Thallium	AA-Fur	U	0.42	U	0.64	U	0.51	U	0.80	U	0.78	U	0.6
Vanadium	ICAP	U	1.1	1.7	1.6	U	1.3	U	2.0	U	2.0	U	1
Zinc	ICAP	140	1.1	100	1.6	85	1.3	190	2.0	130	2.0	120	1

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Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00133		11-215-00134		11-215-00135		11-215-00136		11-215-00137		11-215-00138	
Location		BM1-1		BM1-2		BM1-2		BM1-3		BM1-3		BM1-4	
% Solids		18		20		20		22		21		21	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	120	22	480	15	470	15	110	16	74	14	84	19
Antimony	AA-Fur	U	0.90	U	0.60	U	0.60	U	0.64	U	0.57	0.76	0.76
Arsenic	AA-Fur	3.6	0.90	3.4	0.60	3.3	0.60	2.8	0.64	1.8	0.57	3.1	0.76
Barium	ICAP	5.4	1.3	8.3	0.90	8.4	0.90	5.2	0.96	3.4	0.85	5.1	1.1
Beryllium	ICAP	U	0.90	U	0.60	U	0.60	U	0.64	U	0.57	U	0.76
Cadmium	ICAP	U	1.3	U	0.90	U	0.90	U	0.96	U	0.85	U	1.1
Calcium	ICAP	1500	45	5800	30	10000	30	3300	32	1900	28	7600	38
Chromium	ICAP	U	2.2	U	1.5	2.0	1.5	U	1.6	U	1.4	2.7	1.9
Cobalt	ICAP	U	2.2	U	1.5	U	1.5	U	1.6	U	1.4	U	1.9
Copper	ICAP	35	2.2	43	1.5	32	1.5	27	1.6	16	1.4	25	1.9
Iron	ICAP	380	11	860	7.5	770	7.5	320	8.0	200	7.1	260	9.5
Lead	AA-Fur	U	0.90	0.60	0.60	U	0.60	0.73	0.64	U	0.57	U	0.76
Magnesium	ICAP	790	220	610	150	590	150	630	160	400	140	630	190
Manganese	ICAP	17	0.90	32	0.60	30	0.60	16	0.64	8.3	0.57	13	0.76
Mercury	Cold Vapor	0.79	0.18	0.91	0.15	0.88	0.15	0.58	0.17	0.49	0.14	0.47	0.16
Nickel	ICAP	U	4.5	U	3.0	U	3.0	U	3.2	U	2.8	U	3.8
Potassium	ICAP	2100	900	1800	600	1900	600	2100	640	1300	570	2000	760
Selenium	AA-Fur	2.5	0.90	2.2	0.60	2.0	0.60	2.2	0.64	1.4	0.57	2.4	0.76
Silver	ICAP	U	2.2	U	1.5	U	1.5	U	1.6	U	1.4	U	1.9
Sodium	ICAP	2000	220	920	150	980	150	1200	160	790	140	1500	190
Thallium	AA-Fur	U	0.90	U	0.60	U	0.60	U	0.64	U	0.57	U	0.76
Vanadium	ICAP	U	2.2	U	1.5	U	1.5	U	1.6	U	1.4	U	1.9
Zinc	ICAP	140	2.2	100	1.5	100	1.5	110	1.6	70	1.4	140	1.9

Table 1.10 (Cont) Results of the Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		11-215-00139		11-215-00140		11-215-00237		11-215-00238	
Location		BM1-5		BM1-5		TP-4A-8		TP-7-5	
% Solids		24		23		27		28	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	74	12	60	18	170	12	74	11
Antimony	AA-Fur	U	0.48	U	0.70	U	0.47	U	0.43
Arsenic	AA-Fur	3.1	0.48	3.3	0.70	U	0.47	U	0.43
Barium	ICAP	4.2	0.72	4.3	1.1	4.6	0.71	12	0.64
Beryllium	ICAP	U	0.48	U	0.70	U	0.47	U	0.43
Cadmium	ICAP	U	0.72	U	1.1	U	0.71	U	0.64
Calcium	ICAP	4700	24	4700	35	23000	24	58000	21
Chromium	ICAP	1.7	1.2	4.7	1.8	1.6	1.2	2.1	1.1
Cobalt	ICAP	U	1.2	U	1.8	U	1.2	U	1.1
Copper	ICAP	27	1.2	38	1.8	11	1.2	7.0	1.1
Iron	ICAP	300	6.0	230	8.8	350	5.9	240	5.3
Lead	AA-Fur	U	0.48	U	0.70	U	0.47	U	0.43
Magnesium	ICAP	600	120	610	180	1400	120	2000	110
Manganese	ICAP	9.7	0.48	10	0.70	13	0.47	8.4	0.43
Mercury	Cold Vapor	0.56	0.12	0.52	0.15	U	0.10	U	0.10
Nickel	ICAP	U	2.4	U	3.5	U	2.4	U	2.1
Potassium	ICAP	2100	480	2100	700	10000	470	11000	430
Selenium	AA-Fur	2.0	0.5	2.0	0.70	0.61	0.47	U	0.43
Silver	ICAP	U	1.2	U	1.8	U	1.2	U	1.1
Sodium	ICAP	890	120	980	180	4100	120	5100	110
Thallium	AA-Fur	U	0.48	U	0.70	U	0.47	U	0.43
Vanadium	ICAP	U	1.2	U	1.8	U	1.2	U	1.1
Zinc	ICAP	90	1.2	94	1.8	110	1.2	110	1.1

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Table 1.11 Results of the Analysis for Metals in Soil
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		Method Blank		B1		I4		H5		I5		A2	
Location		Lab		B1		I4		H5		I5		A2	
% Solids		100		100		100		100		100		100	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Arsenic	ICAP	U	7.5	U	6.9	U	7.2	U	7.1	U	6.3	U	7.3
Cadmium	ICAP	U	0.50	U	0.46	U	0.48	U	0.47	0.47	0.42	U	0.49
Chromium	ICAP	U	0.50	13	0.46	22	0.48	15	0.47	21	0.42	12	0.49
Copper	ICAP	U	0.90	7.0	0.83	9.7	0.87	12	0.85	23	0.76	11	0.87
Iron	ICAP	11	9.0	22000	8.3	24000	8.7	15000	8.5	24000	7.6	18000	8.7
Lead	ICAP	U	4.0	13	3.7	28	3.8	160	3.8	150	3.4	73	3.9
Zinc	ICAP	2.0	2.0	28	1.8	92	1.9	150	1.9	210	1.7	170	1.9

Client ID		A3		A4		A0		B0		XRF5		XRF34	
Location		A3		A4		A0		B0		RIVER		UPLAND	
% Solids		100		100		100		100		100		100	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Arsenic	ICAP	U	7.5	U	7.5	U	7.4	U	7.1	U	7.4	50	7.5
Cadmium	ICAP	U	0.50	U	0.50	U	0.50	0.74	0.47	U	0.50	U	0.50
Chromium	ICAP	10	0.50	16	0.50	18	0.50	16	0.47	9.0	0.50	12	0.50
Copper	ICAP	16	0.90	22	0.90	31	0.89	80	0.85	2.8	0.89	28	0.90
Iron	ICAP	14000	9.0	26000	9.0	24000	8.9	21000	8.5	9100	8.9	17000	9.0
Lead	ICAP	46	4.0	46	4.0	140	4.0	390	3.8	8.1	4.0	11	4.0
Zinc	ICAP	290	2.0	410	2.0	690	2.0	680	1.9	19	2.0	22	2.0

Table 1.11 (Cont) Results of the Analysis for Metals in Soil
WA # 2-215 Avtex Fibers
Based on Dry Weight

Client ID		XRF25		XRF37		XRF38		XRF32		XRF31		XRF30	
Location		FLY ASH		UPLAND		UPLAND		UPLAND		UPLAND		UPLAND	
% Solids		100		100		100		100		100		100	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Arsenic	ICAP	84	7.5	U	7.2	U	7.5	U	6.9	U	7.1	U	7.3
Cadmium	ICAP	U	0.50	U	0.48	U	0.50	U	0.46	U	0.48	U	0.49
Chromium	ICAP	17	0.50	9.5	0.48	13	0.50	16	0.46	17	0.48	17	0.49
Copper	ICAP	39	0.90	19	0.87	25	0.90	20	0.83	21	0.86	21	0.87
Iron	ICAP	16000	9.0	15000	8.7	21000	9.0	23000	8.3	23000	8.6	22000	8.7
Lead	ICAP	15	4.0	200	3.8	170	4.0	25	3.7	24	3.8	24	3.9
Zinc	ICAP	39	2.0	220	1.9	420	2.0	960	1.8	1100	1.9	1300	1.9

Client ID		XRF21	
Location		UPLAND	
% Solids		100	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg
Arsenic	ICAP	U	7.3
Cadmium	ICAP	U	0.49
Chromium	ICAP	21	0.49
Copper	ICAP	13	0.87
Iron	ICAP	26000	8.7
Lead	ICAP	26	3.9
Zinc	ICAP	1700	1.9

QA/QC for VOC

Each sample was spiked with a three component mixture of CLP surrogate standards consisting of toluene-d_8, 4-bromofluorobenzene and dibromofluoromethane. The surrogate percent recoveries for the water samples, listed in Table 2.1, ranged from 86 to 111. All sixty values were within the acceptable QC limits.

The surrogate percent recoveries for the soil samples, listed in Table 2.2, ranged from 12 to 163. Eighty-seven out of one hundred and four reported values were within the acceptable QC limits. One percent recovery was not reported because of matrix interference.

The percent recoveries of the laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analysis for the water samples, listed in Table 2.3, ranged from 101 to 113. All ten values were within the acceptable QC limits. The relative percent differences (RPDs), also listed in Table 2.3, ranged from 0 (zero) to 5. QC limits are not available for the RPDs for this analysis.

Sample 11-215-00414 was chosen for the matrix spike/matrix spike duplicate (MS/MSD) analyses for the water samples. The percent recoveries, ranging from 100 to 111, are listed in Table 2.4. All ten values were within the acceptable QC limits. The relative percent differences, also listed in Table 2.4, ranged from 1 to 9, and all 5 were within the accepable QC limits.

The percent recoveries of the laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analysis for the soil samples, listed in Table 2.5, ranged from 90 to 115. All thirty values were within the acceptable QC limits. The relative percent differences (RPDs), also listed in Table 2.5, ranged from 0 (zero) to 18. QC limits are not available for the RPDs for this analysis.

Samples 11-215-00501 and 11-215-00605 were chosen for the matrix spike/matrix spike duplicate (MS/MSD) analyses for the soil samples. The percent recoveries, ranging from 85 to 197, are listed in Table 2.6. Seventeen out of twenty values were within the acceptable QC limits. The relative percent differences, also listed in Table 2.6, ranged from 0 (zero) to 66, and nine out of ten values were within the acceptable QC limits.

Table 2.1 Results of the Surrogate Recoveries for VOC in Water WA # 2-215 Avtex Fibers

Sample ID	S1 (TOL)	S2 (BFB)	S3 (DBF)	Total Out
VBLK1	108	111	108	0
LCS1	108	108	109	0
LCSD1	108	111	108	0
215-00414 MS	108	101	100	0
215-00414 MSD	110	108	106	0
215-00414	105	108	99	0
11-215-00046	105	106	97	0
11-215-00410	106	105	98	0
11-215-00411	106	105	92	0
11-215-00412	108	109	86	0
11-215-00413	104	105	99	0
11-215-00415	100	100	96	0
11-215-00417	106	107	101	0
11-215-00418	103	101	96	0
11-215-00419	104	103	98	0
11-215-00601	103	99	94	0
11-215-00602	105	106	92	0
11-215-00603	103	105	96	0
11-215-00604	104	104	96	0
11-215-00047	105	101	99	0

	QC Limits
S1 (TOL) = Toluene-d8	88-110
S2 (BFB) = Bromofluorobenzene	86-115
S3 (DBF) = Dibromofluoromethane	86-118

Table 2.2 Results of the Surrogate Recoveries for VOC in Soil WA # 2-215 Avtex Fibers

Sample ID	S1 (TOL)	S2 (BFB)	S3 (DBF)	Total Out
VBLK1	103	102	106	0
LCS1	104	101	106	0
LCSD1	106	104	108	0
11-215-00402	106	93	106	0
11-215-00407	97	79	95	0
11-215-00408	106	105	105	0
11-215-00409	107	108	101	0
11-215-00502	108	101	108	0
11-215-00503	108	97	108	0
VBLK2	98	96	95	0
LCS2	98	94	96	0
LCSD2	103	101	112	0
215-00501 MS	86	61 *	96	1
215-00501 MSD	90	66 *	100	1
11-215-00501	84	62 *	97	1
11-215-00044	85	68 *	85	1
11-215-00045	79 *	20 *	163 *	3
11-215-00401	82	56 *	86	1
11-215-00404	83	67 *	84	1
11-215-00405	93	82	96	0
11-215-00406	96	81	96	0
11-215-00410	94	86	94	0
11-215-00504	91	86	93	0
11-215-00505	92	74	103	0
11-215-00606	60 *	32 *	83	2
11-215-00607	77 *	46 *	76 *	3
11-215-00608	93	77	89	0
VBLK3	100	102	92	0
11-215-00605	93	76	96	0
11-215-00606 MS	101	82	127 *	1
LCS3	106	110	102	0
11-215-00606 MSD	88	63 *	96	1
11-215-00403	97	90	93	0
LCSD3	106	106	102	0
11-215-00506	82	12 *	MI	2

	QC Limits
S1 (TOL) = Toluene-d8	81-117
S2 (BFB) = Bromofluorobenzene	74-121
S3 (DBF) = Dibromofluoromethane	80-120

Table 2.3 Results of the LCS/LCSD Analysis for VOC in Water
WA # 2-215 Avtex Fibers

Sample ID: LCS

Parameter	Spike Added µg/L	Sample Conc. µg/L	LCS Rec µg/L	LCS % Rec	LCSD Rec µg/L	LCSD % Rec	RPD	QC Limits Rec
1,1-Dichloroethene	10	U	10.63	106	10.62	106	0	76-125
Trichloroethene	10	U	10.95	109	11.34	113	3	78-127
Benzene	10	U	10.90	109	11.25	113	3	78-124
Toluene	10	U	10.25	103	10.63	106	4	74-129
Chlorobenzene	10	U	10.10	101	10.66	107	5	74-128

Table 2.4 Results of the MS/MSD Analysis for VOC in Water
WA # 2-215 Avtex Fibers

Sample ID: 11-215-00414

Parameter	Spike Added µg/L	Sample Conc. µg/L	MS Rec µg/L	MS % Rec	MSD Rec µg/L	MSD % Rec	RPD	QC Limits RPD	QC Limits Rec
1,1-Dichloroethene	10	U	10.8	108	10.1	101	7	40	76-125
Trichloroethene	10	U	11.1	111	10.9	109	2	40	78-127
Benzene	10	U	10.9	109	10.0	100	9	40	78-124
Toluene	10	U	10.2	102	10.1	101	1	40	74-129
Chlorobenzene	10	U	10.3	103	10.1	101	2	40	61-150

Table 2.5 Results of the LCS/LCSD Analysis for VOC in Soil
WA # 2-215 Avtex Fibers

Sample ID: LCS 1

Parameter	Spike Added µg/kg	Sample Conc. µg/kg	LCS Rec µg/kg	LCS % Rec	LCSD Rec µg/kg	LCSD % Rec	RPD	QC Limits Rec
1,1-Dichloroethene	50.	U	49.26	99	45.15	90	9	83-116
Trichloroethene	50	U	52.45	105	49.98	100	5	87-116
Benzene	50	U	51.03	102	48.84	98	4	87-115
Toluene	50	U	50.42	101	47.53	95	6	85-115
Chlorobenzene	50	U	51.56	103	48.25	97	7	86-114

Sample ID: LCS 2

Parameter	Spike Added µg/kg	Sample Conc. µg/kg	LCS Rec µg/kg	LCS % Rec	LCSD Rec µg/kg	LCSD % Rec	RPD	QC Limits Rec
1,1-Dichloroethene	50	U	49.80	100	57.71	115	15	83-116
Trichloroethene	50	U	49.50	99	54.90	110	10	87-116
Benzene	50	U	47.57	95	56.72	113	18	87-115
Toluene	50	U	48.72	97	52.01	104	7	85-115
Chlorobenzene	50	U	49.30	99	51.08	102	4	86-114

Sample ID: LCS 3

Parameter	Spike Added µg/kg	Sample Conc. µg/kg	LCS Rec µg/kg	LCS % Rec	LCSD Rec µg/kg	LCSD % Rec	RPD	QC Limits Rec
1,1-Dichloroethene	50	U	48.27	97	52.17	104	8	83-116
Trichloroethene	50	U	50.88	102	50.85	102	0	87-116
Benzene	50	U	55.85	112	55.35	111	1	87-115
Toluene	50	U	51.37	103	50.44	101	2	85-115
Chlorobenzene	50	U	50.67	101	49.73	99	2	86-114

Table 2.6 Results of the MS/MSD Analysis for VOC in Soil
WA # 2-215 Avtex Fibers
Based on Dry weight

Sample ID: 11-215-00501

Parameter	Spike Added µg/kg	Sample Conc. µg/kg	LCS Rec µg/kg	LCS % Rec	LCSD Rec µg/kg	LCSD % Rec	RPD	QC Limits RPD	QC Limits Rec
1,1-Dichloroethene	50	U	49.2	98	49.2	98	0	40	83-116
Trichloroethene	50	U	43.5	87	42.8	86 *	2	40	87-116
Benzene	50	U	51.0	102	52.0	104	2	40	87-115
Toluene	50	U	42.6	85	43.2	86	1	40	85-115
Chlorobenzene	50	U	44.4	89	46.2	92	4	40	86-114

Sample ID: 11-215-00605

Parameter	Spike Added µg/kg	Sample Conc. µg/kg	LCS Rec µg/kg	LCS % Rec	LCSD Rec µg/kg	LCSD % Rec	RPD	QC Limits RPD	QC Limits Rec
1,1-Dichloroethene	50	U	98.5	197 *	49.5	99	66 *	40	83-116
Trichloroethene	50	U	48.8	98	44.4	89	9	40	87-116
Benzene	50	U	66.7	133 *	52.5	105	24	40	87-115
Toluene	50	U	49.3	99	44.9	90	9	40	85-115
Chlorobenzene	50	U	46.8	94	46.3	93	1	40	86-114

QA/QC for BNA

Before extraction, each sample was spiked with a six component mixture of CLP surrogate standards consisting of nitrobenzene-d_5, 2-fluorobiphenyl, terphenyl-d_{14}, phenol-d_5, 2-fluorophenol, and 2,4,6-tribromophenol. The surrogate percent recoveries, listed in Table 2.7, ranged from 0 (zero) to 133. Fifty-five out of sixty values were within the acceptable QC limits.

The internal standard areas (for 1,4-dichlorobenzene-d_4, naphthalene-d_8, acenaphthene-d_{10}, phenanthrene-d_{10}, chrysene-d_{12}, perylene-d_{12}) for the soil samples are also listed in Table 2.7. All sixty areas were within the acceptable QC limits.

Sample 11-215-00505 was chosen for the matrix spike/matrix spike duplicate (MS/MSD) analyses for the soil samples. The percent recoveries, ranging from 78 to 145, are listed in Table 2.8. Five out of twenty-two values were within the acceptable QC limits. The relative percent differences, ranging from 0 (zero) to 11, are also listed in Table 2.8. All eleven values were within the acceptable QC limits.

The results of the initial calibrations are listed in Table 2.9.

The results of the continuing calibrations are listed in Table 2.10.

Table 2.7 Results of the Internal Standard Areas and Surrogate Recoveries for BNA
WA # 2-215 Avtex Fibers

		Internal Standards			Surrogates		
		1	2	3	NBZ	FBP	TPH
	Data	4	5	6	PHL	2FP	TBP
Sample #	File	area	area	area	%	%	%
CAL CHECK 50 PPM BNA	>AV000	47244	226943	145874	NA	NA	NA
		279667	206500	179207	NA	NA	NA
SBLK052197	>AV001	44345	187077	136378	103	110	109
		252194	242206	239818	103	99	95
11-215-005	>AV002	45877	210578	139179	93	112	109
		256424	239821	203720	96	87	98
11-215-005 MS	>AV003	44476	223580	151559	91	99	108
		257318	242001	224053	111	95	94
11-215-005 MSD	>AV004	42877	211655	139611	95	106	120
		241630	228002	195338	118*	103	103
11-215-00506	>AV005	53944	262631	175017	96	102	82
		298324	280033	262887	38	21*	0
11-215-00507	>AV006	46093	217257	143253	82	93	82
		284476	286786	273174	87	84	79
11-215-00501	>AV007	45247	214186	143270	94	103	116
		234896	237239	219381	102	95	112
11-215-00502	>AV008	47636	218704	153826	85	98	97
		270592	280805	254819	90	94	100
11-215-00503	>AV009	48850	222776	154957	101	113	124
		259874	263902	247161	109	104	133*
11-215-00504	>AV010	42075	219811	140025	98	123*	125
		244782	187153	193662	129*	113	114

SURROGATE LIMITS	SOIL
S1 (NBZ) = Nitrobenzene-d5	(23-120)
S2 (FBP) = 2-Fluorobiphenyl	(30-115)
S3 (TPH) = Terphenyl-d14	(18-137)
S4 (PHL) = Phenol-d5	(24-113)
S5 (2FP) = 2-Fluorophenol	(25-121)
S6 (TBP) = 2,4,6-Tribromophenol	(19-122)

Table 2.8 Results of MS/MSD Analysis for BNA in Soil
WA # 2-215 Avtex Fibers site
(based on dry weight)

Sample ID: 11-215-00505

Compound Name	Sample Conc. (µg/kg)	MS Spike Added (µg/kg)	MSD Spike Added (µg/kg)	MS Conc. (µg/kg)	MSD Conc. (µg/kg)	MS % Rec.	MSD % Rec.	RPD	QC Limits RPD	QC Limits % Rec.
Phenol	U	4180	4180	4600	4970	110 *	119 *	8	35	26 - 90
2-Chlorophenol	U	4180	4180	4840	4840	116 *	118 *	0	50	25 - 102
1,4-Dichlorobenzene	U	2090	2090	2500	2660	120 *	127 *	6	27	28 - 104
N-Nitroso-Di-N-Propylamine	U	2090	2090	2640	2750	126 *	132 *	4	38	41 - 126
1,2,4-Trichlorobenzene	U	2090	2090	2690	2820	129 *	135 *	5	23	38 - 107
4-Chloro-3-Methylphenol	U	4180	4180	4590	4720	110 *	113 *	3	33	26 - 103
Acenaphthene	U	2090	2090	2800	3030	134	145 *	8	19	31 - 137
4-Nitrophenol	U	4180	4180	3270	3910	78	94	18	50	11 - 114
2,4-Dinitrotoluene	U	2090	2090	2200	2460	105 *	118 *	11	47	28 - 89
Pentachlorophenol	U	4180	4180	4630	5190	111 *	124 *	11	47	17 - 109
Pyrene	U	2090	2090	2490	2690	119	129	8	36	35 - 142

Table 2.9 Results of the Initial Calibration for BNA
WA # 2-215 Avtex Fibers

Instrument ID: 888632
Calibration Date: 03/19/97

Minimum $\overline{RF}$ for SPCC is 0.05   Maximum % RSD for CCC is 30%

Laboratory ID:	>VW004	>VW000	>VW003	>VW002	>VW001				
	RF	RF	RF	RF	RF				
Compound	20.00	50.00	80.00	120.00	160.00	$\overline{RRT}$	$\overline{RF}$	% RSD	
2-Fluorophenol	1.22381	1.16014	1.26442	1.27672	1.12366	.682	1.20975	5.475	
Phenol-d5	1.97506	1.81932	1.78292	1.84780	1.59783	.934	1.80459	7.556	
Phenol	1.96257	1.85393	2.09824	2.08497	1.67251	.937	1.93444	9.152	*
bis(-2-Chloroethyl)Ether	1.68548	1.55644	1.45444	1.28847	1.15275	.950	1.42752	14.807	
2-Chlorophenol	1.40490	1.43770	1.29601	1.26666	1.15670	.953	1.31239	8.592	
1,3-Dichlorobenzene	1.63938	1.54179	1.47497	1.41275	1.17816	.989	1.44941	11.960	
1,4-Dichlorobenzene	1.55728	1.54737	1.49303	1.35753	1.15440	1.005	1.42192	11.916	*
Benzyl alcohol	1.66506	1.54486	1.49349	1.56170	1.49799	1.057	1.55262	4.470	
1,2-Dichlorobenzene	1.55005	1.30867	1.14849	1.17253	.97689	1.055	1.23133	17.353	
2-Methylphenol	1.44948	1.41463	1.39102	1.29525	1.14223	1.098	1.33852	9.246	
bis(2-Chloroisopropyl)ether	3.55762	3.37496	3.51642	3.53239	2.98179	1.102	3.39264	7.086	
4-Methylphenol	1.54257	1.24118	1.11326	1.13321	1.15489	1.143	1.23702	14.360	
N-Nitroso-Di-n-propylamine	1.85285	1.67473	1.74558	1.89166	1.66669	1.145	1.76630	5.797	**
Hexachloroethane	.51594	.43706	.41024	.46842	.45176	1.140	.45669	8.632	
Nitrobenzene-d5	.41973	.42403	.43801	.43665	.40835	.853	.42535	2.904	
Nitrobenzene	.44232	.41738	.39614	.40713	.39368	.857	.41133	4.796	
Isophorone	.86788	.88986	.85185	.89426	.89978	.909	.88073	2.291	
2-Nitrophenol	.21137	.23494	.23062	.21973	.20033	.925	.21940	6.428	*
2,4-Dimethylphenol	.29308	.31174	.29217	.29925	.29379	.944	.29800	2.738	
bis(2-Chloroethoxy)methane	.47150	.47750	.44812	.48327	.42478	.965	.46104	5.265	*
2,4-Dichlorophenol	.28844	.27762	.28640	.28900	.25582	.977	.27946	5.003	
1,2,4-Trichlorobenzene	.30450	.27929	.28013	.26396	.22859	.993	.27129	10.297	
Naphthalene	1.01049	.97637	.94162	.88978	.80624	1.004	.92490	8.644	
4-Chloroaniline	.49376	.46759	.44372	.41856	.41893	1.028	.44851	7.231	
Hexachlorobutadiene	.17808	.16046	.16912	.16154	.14390	1.048	.16262	7.764	*
4-Chloro-3-methylphenol	.42401	.41912	.42335	.40238	.34740	1.143	.40325	8.042	*
2-Methylnaphthalene	.66877	.63203	.59072	.54986	.50178	1.159	.58863	11.191	
Hexachlorocyclopentadiene	.27634	.32812	.30853	.28782	.24538	.869	.28924	10.900	**
2,4,6-Trichlorophenol	.39146	.38269	.36272	.35973	.31811	.884	.36294	7.821	*
2,4,5-Trichlorophenol	.38642	.39804	.39275	.35126	.31187	.889	.36807	9.876	

RF - Response Factor (Subscript is amount in ug/ml)

$\overline{RRT}$ - Average Relative Retention Time (RT Std/RT Istd)

$\overline{RF}$ - Average Response Factor
%RSD - Percent Relative Standard Deviation
CCC - Calibration Check Compounds (*)
SPCC - System Performance Check Compounds (**)

Table 2.9 (Cont) Results of the Initial Calibration for BNA
WA # 2-215 Avtex Fibers

Instrument ID: 888632
Calibration Date: 03/19/97

Minimum $\overline{RF}$ for SPCC is 0.05   Maximum % RSD for CCC is 30%

Compound	Laboratory ID: >VW004 RF 20.00	>VW000 RF 50.00	>VW003 RF 80.00	>VW002 RF 120.00	>VW001 RF 160.00	$\overline{RRT}$	$\overline{RF}$	% RSD		
2-Chloronaphthalene	1.15839	.97892	.94036	.86718	.71867	.909	.93270	17.224		
2-Fluorobiphenyl	1.24700	1.14183	1.14127	1.02916	.87598	.897	1.08705	12.963		
2-Nitroaniline	.54137	.52445	.54993	.51408	.45763	.936	.51749	7.011		
Dimethylphthalate	1.58489	1.45657	1.29155	1.15779	.90207	.974	1.27857	20.768		
Acenaphthylene	2.38396	2.07415	1.90058	1.51792	1.19646	.975	1.81461	25.687		
3-Nitroaniline	.69686	.70325	.70017	.61854	.50623	1.003	.64501	13.220		
Acenaphthene	1.88604	1.60791	1.50584	1.33239	1.02831	1.006	1.47210	21.679	*	
2,4-Dinitrophenol	.21712	.27802	.30157	.27910	.27905	1.020	.27097	11.694		**
4-Nitrophenol	.40602	.46028	.45303	.43464	.39244	1.036	.42928	6.843		**
Dibenzofuran	1.80715	1.61697	1.53165	1.38899	1.10962	1.031	1.49088	17.533		
2,6-Dinitrotoluene	.37451	.36258	.37486	.37615	.32401	.984	.36242	6.115		
2,4-Dinitrotoluene	.55196	.58512	.56120	.55556	.46139	1.045	.54305	8.736		
Diethylphthalate	1.99515	1.79811	1.58422	1.27000	.91965	1.088	1.51342	28.226		
4-Chlorophenyl-phenylether	.94230	.81661	.77745	.66787	.48070	1.090	.73698	23.560		
Fluorene	1.43980	1.19522	1.10286	.95546	.77945	1.086	1.09456	22.751		
4-Nitroaniline	.49752	.54123	.53361	.53451	.48207	1.103	.51779	5.079		
4,6-Dinitro-2-methylphenol	.23010	.25497	.26937	.25625	.23060	.900	.24826	6.965		
N-Nitrosodiphenylamine	.75825	.68557	.63955	.56787	.41198	.903	.61264	21.518	*	
2,4,6-Tribromophenol	.11265	.11826	.13281	.12100	.10803	.915	.11855	7.948		
4-Bromophenyl-phenylether	.23329	.21874	.21692	.19778	.15828	.946	.20500	14.151		
Hexachlorobenzene	.27110	.23848	.23042	.21490	.19614	.962	.23021	12.162		
Pentachlorophenol	.18484	.20032	.18875	.17730	.15953	.987	.18215	8.308		**
Phenanthrene	1.25553	1.08711	.99947	.89771	.79840	1.003	1.00764	17.452		
Anthracene	1.19326	1.06483	1.02673	.92405	.76175	1.009	.99413	16.269		
Carbazole	1.34251	1.11107	1.05334	1.02474	.85388	1.033	1.07711	16.394		
Di-n-butylphthalate	1.84431	1.67211	1.49298	1.31874	1.16034	1.090	1.49769	18.176		
Fluoranthene	1.49291	1.27846	1.16617	1.10923	.93427	1.156	1.19621	17.329	*	
Pyrene	1.47518	1.62233	1.66554	1.67852	1.75272	.882	1.63886	6.276		
Terphenyl-d14	1.04663	1.13483	1.07006	1.14117	1.21464	.902	1.12147	5.897		
Butylbenzylphthalate	.81741	.89300	.93399	.93990	.95983	.955	.90883	6.226		
3,3'-Dichlorobenzidine	.43171	.48934	.45417	.47772	.46900	1.000	.46439	4.807		
Benzo(a)anthracene	1.32859	1.44462	1.44058	1.51540	1.51519	.998	1.44888	5.276		
Bis(2-Ethylhexyl)phthalate	1.15520	1.32992	1.21755	1.26305	1.21962	1.012	1.23707	5.221		
Chrysene	1.28544	1.35732	1.29342	1.29098	1.31477	1.003	1.30838	2.257		
Di-n-octylphthalate	2.01852	2.26667	1.78904	1.62370	1.44489	.940	1.82856	17.695	*	
Benzo(b)fluoranthene	1.23423	1.43134	1.23758	1.28240	1.37052	.966	1.31121	6.619		
Benzo(k)fluoranthene	1.12406	1.28255	.97594	.93877	.69767	.969	1.00380	21.763		
Benzo(a)pyrene	1.07642	1.24112	1.00225	1.06399	.97635	.995	1.07203	9.638	*	
Indeno(1,2,3-cd)pyrene	.93159	1.22594	1.15926	.96481	.82837	1.122	1.02199	16.180		
Dibenzo(a,h)anthracene	.96333	1.13411	.96176	.92945	.77539	1.126	.95281	13.388		
Benzo(g,h,i)perylene	.90948	1.10419	.93639	.88039	.71056	1.159	.90820	15.478		

RF - Response Factor (Subscript is amount in ug/ml)

$\overline{RRT}$ - Average Relative Retention Time (RT Std/RT Istd)

$\overline{RF}$ - Average Response Factor
%RSD - Percent Relative Standard Deviation
CCC - Calibration Check Compounds (*)
SPCC - System Performance Check Compounds (**)

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Table 2.10 Results of the Continuing Calibration for BNA
WA # 2-215 Avtex Fibers

Calibration Date: 06/03/97
Time: 09:41
Instrument ID: 888632 Initial Calibration Date: 03/19/97

Minimum $\overline{RF}$ for SPCC is 0.05 Maximum % Diff for CCC is 25%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC
2-Fluorophenol	1.20975	1.18742	1.85		
Phenol-d5	1.80459	1.79113	.75		
Phenol	1.93444	1.82484	5.67	*	
bis(-2-Chloroethyl)Ether	1.42752	1.45388	1.85		
2-Chlorophenol	1.31239	1.37348	4.65		
1,3-Dichlorobenzene	1.44941	1.50533	3.86		
1,4-Dichlorobenzene	1.42192	1.48563	4.48	*	
Benzyl alcohol	1.55262	1.40058	9.79		
1,2-Dichlorobenzene	1.23133	1.36292	10.69		
2-Methylphenol	1.33852	1.38887	3.76		
bis(2-Chloroisopropyl)ether	3.39264	3.30089	2.70		
4-Methylphenol	1.23702	1.23590	.09		
N-Nitroso-Di-n-propylamine	1.76630	1.64098	7.10		**
Hexachloroethane	.45669	.47373	3.73		
Nitrobenzene-d5	.42535	.43012	1.12		
Nitrobenzene	.41133	.41161	.07		
Isophorone	.88073	.78492	10.88		
2-Nitrophenol	.21940	.22375	1.98	*	
2,4-Dimethylphenol	.29800	.29286	1.73		
bis(2-Chloroethoxy)methane	.46104	.43685	5.25	*	
2,4-Dichlorophenol	.27946	.25538	8.62		
1,2,4-Trichlorobenzene	.27129	.28123	3.66		
Naphthalene	.92490	.99479	7.56		
4-Chloroaniline	.44851	.42277	5.74		
Hexachlorobutadiene	.16262	.17182	5.66	*	
4-Chloro-3-methylphenol	.40325	.40809	1.20	*	
2-Methylnaphthalene	.58863	.64282	9.21		
Hexachlorocyclopentadiene	.28924	.31728	9.69		**
2,4,6-Trichlorophenol	.36294	.39565	9.01	*	
2,4,5-Trichlorophenol	.36807	.38190	3.76		
2-Chloronaphthalene	.93270	1.13261	21.43		
2-Fluorobiphenyl	1.08705	1.34471	23.70		

RF - Response Factor from daily standard file at 50.00 ug/ml

$\overline{RF}$ - Average Response Factor from Initial Calibration Form VI
%Diff - % Difference from original average or curve
CCC - Calibration Check Compounds (*)
SPCC - System Performance Check Compounds (**)

Table 2.10 (Cont) Results of the Continuing Calibration for BNA
WA # 2-215 Avtex Fibers

Calibration Date: 06/03/97
Time: 09:41
Instrument ID: 888632 Initial Calibration Date: 03/19/97

Minimum $\overline{RF}$ for SPCC is 0.05 Maximum % Diff for CCC is 25%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC
2-Nitroaniline	.51749	.51884	.26		
Dimethylphthalate	1.27857	1.49080	16.60		
Acenaphthylene	1.81461	2.12059	16.86		
3-Nitroaniline	.64501	.71299	10.54		
Acenaphthene	1.47210	1.64554	11.78	*	
2,4-Dinitrophenol	.27097	.26638	1.70		**
4-Nitrophenol	.42928	.43488	1.31		**
Dibenzofuran	1.49088	1.80720	21.22		
2,6-Dinitrotoluene	.36242	.38852	7.20		
2,4-Dinitrotoluene	.54305	.53204	2.03		
Diethylphthalate	1.51342	1.80776	19.45		
4-Chlorophenyl-phenylether	.73698	.82046	11.33		
Fluorene	1.09456	1.30304	19.05		
4-Nitroaniline	.51779	.50532	2.41		
4,6-Dinitro-2-methylphenol	.24826	.23515	5.28		
N-Nitrosodiphenylamine	.61264	.72603	18.51	*	
2,4,6-Tribromophenol	.11855	.12122	2.25		
4-Bromophenyl-phenylether	.20500	.22785	11.14		
Hexachlorobenzene	.23021	.22278	3.23		
Pentachlorophenol	.18215	.18004	1.16		**
Phenanthrene	1.00764	1.08462	7.64		
Anthracene	.99413	1.16967	17.66		
Carbazole	1.07711	1.15344	7.09		
Di-n-butylphthalate	1.49769	1.57703	5.30		
Fluoranthene	1.19621	1.27961	6.97	*	
Pyrene	1.63886	1.65349	.89		
Terphenyl-d14	1.12147	1.17082	4.40		
Butylbenzylphthalate	.90883	.98722	8.63		
3,3'-Dichlorobenzidine	.46439	.46728	.62		
Benzo(a)anthracene	1.44888	1.47890	2.07		
Bis(2-Ethylhexyl)phthalate	1.23707	1.36288	10.17		
Chrysene	1.30838	1.32623	1.36		
Di-n-octylphthalate	1.82856	2.38055	30.19	*	
Benzo(b)fluoranthene	1.31121	1.43902	9.75		
Benzo(k)fluoranthene	1.00380	1.17777	17.33		
Benzo(a)pyrene	1.07203	1.26404	17.91	*	
Indeno(1,2,3-cd)pyrene	1.02199	1.15549	13.06		
Dibenzo(a,h)anthracene	.95281	1.16491	22.26		
Benzo(g,h,i)perylene	.90820	1.16515	28.29		

RF - Response Factor from daily standard file at 50.00 ug/ml

$\overline{RF}$ - Average Response Factor from Initial Calibration Form VI
%Diff - % Difference from original average or curve
CCC - Calibration Check Compounds (*)
SPCC - System Performance Check Compounds (**)

QA/QC for Pesticides/PCBs

Each sample was spiked with a solution of tetrachloro-m-xylene and decachlorobiphenyl as surrogates. Percent recoveries for the water samples ranged from 0 (zero) to 141 and are listed in Table 2.11. Thirty-six out of thirty-eight values were within the acceptable QC limits.

Percent recoveries for the soil samples ranged from 23 to 192 and are listed in Table 2.12. Thirty-eight out of fifty-eight values were within the acceptable QC limits.

Percent recoveries for the tissue samples ranged from 17 to 112 and are listed in Table 2.13. One hundred and twenty-two out of two hundred and forty-six values were within the acceptable QC limits.

The water blank WBLK 051497 was chosen for the blank spike/blank spike duplicate (BS/BSD) analyses for the water samples. The percent recoveries ranged from 98 to 174 and are listed in Table 2.14. Eight out of twelve values were within the acceptable QC limits. The relative percent differences (RPDs), also listed in Table 2.14, ranged from 1 to 6. All six values were within the acceptable QC limits.

Sample B 11-215-00414 was chosen for the matrix spike/matrix spike duplicate (MS/MSD) analyses for the water samples. The percent recoveries ranged from 69 to 118 and are listed in Table 2.15. All twelve values were within the acceptable QC limits. The relative percent differences (RPDs), also listed in Table 2.15, ranged from 0 (zero) to 9. All six values were within the acceptable QC limits.

Samples A 11-215-00403, 11-215-00505 and 11-215-00605 were chosen for the MS/MSD analyses for the soil samples. The percent recoveries ranged from 8 to 211 and are listed in Table 2.16. Twenty-three out of thirty-five reported values were within the acceptable QC limits. One value was not calculated because the analyte was not recovered. The RPDs, also listed in Table 2.16, ranged from 4 to 59 and fourteen out of seventeen reported values were within the acceptable QC limits. One value was not calculated because the analyte was not recovered.

Samples 11-215-00201, 11-215-00100, 11-215-00133, 11-215-00238, 11-215-00065, 11-215-00070, 11-215-00115, 11-215-00232, 11-215-00234 and 11-215-00140 were chosen for the MS/MSD analyses for the tissue samples. The percent recoveries ranged from 47 to 385 and are listed in Table 2.17. One hundred and thirteen out of one hundred and twenty values were within the acceptable QC limits. The RPDs, also listed in Table 2.17, ranged from 0 (zero) to 21 and all sixty values were within the acceptable QC limits.

Table 2.11 Results of the Surrogate Recoveries for Pesticides/PCBs in Water
WA# 2-215 Avtex Fibers

Sample ID	Percent Recovery TCMX	DCBP
WBLK05149701	89	101
WBLK051497 MS	91	93
WBLK051497 MSD	89	100
B 11-215-00046	80	127
B 11-215-00047	68	130
WBLK05199701	64	101
B 11-215-00414	78	120
B 11-215-00414 MS	75	138
B 11-215-00414 MSD	76	106
B 11-215-00410	75	127
B 11-215-00411	76	124
B 11-215-00412	82	113
B 11-215-00413	80	141
B 11-215-00419	65	90
B 11-215-00415	74	113
B 11-215-00601	73	103
B 11-215-00602	68	98
B 11-215-00603	77	124
B 11-215-00604	5 *	0 *

TCMX denotes Tetrachloro-m-xylene
DCBP denotes Decachlorobiphenyl

	Advisory QC Limits
TCMX	60-150
DCBP	60-150

[redacted]

Table 2.12 Results of the Surrogate Recoveries for Pesticides/PCBs in Soil
WA# 2-215 Avtex Fibers

Sample ID	Percent Recovery TCMX	DCBP
SBLK05179701	95	146
A 11-215-00403	70	125
A 11-215-00403 MS	77	89
A 11-215-00493 MSD	67	83
A 11-215-00605	45 *	88
A 11-215-00605 MS	49 *	88
A 11-215-00605 MSD	40 *	65
A 11-215-00404	50 *	69
A 11-215-00405	49 *	73
B 11-215-00044	90	74
B 11-215-00045	43 *	48 *
A 11-215-00401	47 *	62
A 11-215-00402	46 *	63
A 11-215-00406	63	106
A 11-215-00407	51 *	94
A 11-215-00607	53 *	41 *
A 11-215-00608	49 *	38 *
A 11-215-00606	66	23 *
SBLK05219701	112	114
11-215-00507	116	97
11-215-00502	93	107
11-215-00506	92	132
11-215-00503	109	135
11-215-00410	144	191 *
11-215-00505	119	158 *
11-215-00505MS	121	159 *
11-215-00505MSD	126	192 *
11-215-00504	143	183 *
11-215-00501	93	128

TCMX denotes Tetrachloro-m-xylene
DCBP denotes Decachlorobiphenyl

	Advisory QC Limits
TCMX	60-150
DCBP	60-150

Table 2.13 Results of the Surrogate Recoveries for Pesticides/PCBs in Tissue WA # 2-215 Avtex Fibers

Sample ID	Percent Recovery TCMX	DCBP
11-215-00209	67	27 *
11-215-00210	101	27 *
11-215-00211	81	26 *
11-215-00212	85	25 *
11-215-00213	77	60
11-215-00214	90	23 *
11-215-00215	90	31 *
11-215-00216	81	29 *
11-215-00217	86	36 *
11-215-00218	79	21 *
MBLK 051797	48 *	78
11-215-00066	56 *	48 *
11-215-00219	95	21 *
11-215-00220	72	24 *
11-215-00221	78	31 *
11-215-00222	87	36 *
11-215-00223	87	24 *
11-215-00224	75	17 *
11-215-00225	83	21 *
11-215-00226	76	18 *
11-215-00227	83	19 *
11-215-00228	79	28 *
11-215-00229	74	30 *
11-215-00230	75	26 *
11-215-00231	72	24 *
11-215-00232	80	25 *
11-215-00233	70	18 *
11-215-00234	89	28 *
11-215-00235	80	22 *
11-215-00236	148	41 *

TCMX denotes Tetrachloro-m-xylene
DCBP denotes Decachlorobiphenyl

	Advisory QC Limits
TCMX	60-150
DCBP	60-150

Table 2.13 (Cont) Results of the Surrogate Recoveries for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers

Sample ID	Percent Recovery TCMX	DCBP
11-215-00091	77	51 *
11-215-00092	76	45 *
11-215-00093	70	48 *
11-215-00094	81	45 *
MBLK 051997	46 *	99
11-215-00090	64	52 *
11-215-00095	62	57 *
11-215-00096	72	51 *
11-215-00097	74	46 *
11-215-00100	66	57 *
11-215-00101	69	47 *
11-215-00102	83	52 *
11-215-00103	74	43 *
11-215-00104	70	51 *
11-215-00105	73	46 *
11-215-00106	75	42 *
11-215-00107	74	48 *
11-215-00110	90	40 *
11-215-00111	67	40 *
11-215-00112	84	39 *
11-215-00113	73	46 *
11-215-00114	80	47 *
11-215-00115	72	61
11-215-00116	83	45 *
11-215-00117	81	51 *
MBLK 052097	75	112
11-215-00130	87	51 *
11-215-00131	67	52 *
11-215-00132	77	52 *
11-215-00133	65	42 *

TCMX denotes Tetrachloro-m-xylene
DCBP denotes Decachlorobiphenyl

	Advisory QC Limits
TCMX	60-150
DCBP	60-150

Table 2.13 (Cont) Results of the Surrogate Recoveries for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers

Sample ID	Percent Recovery TCMX	DCBP
11-215-00134	81	46 *
11-215-00135	82	51 *
11-215-00136	89	45 *
11-215-00137	88	50 *
11-215-00138	95	45 *
11-215-00139	91	44 *
11-215-00140	87	45 *
11-215-00237	83	25 *
11-215-00238	68	40 *
MBLK 052197	44 *	88
11-215-00065	58 *	55 *
11-215-00070	147	90
MBLK 052297	59 *	93
11-215-00201 MS	79	25 *
11-215-00201 MSD	82	26 *
11-215-00100 MS	80	44 *
11-215-00100 MSD	65	59 *
11-215-00133 MS	69	55 *
11-215-00133 MSD	76	56 *
11-215-00238 MS	67	42 *
11-215-00238 MSD	71	40 *
11-215-00065 MS	61	60
11-215-00065 MSD	57 *	52 *
11-215-00070 MS	68	49 *
11-215-00070 MSD	72	44 *
11-215-00115 MS	72	48 *
11-215-00115 MSD	83	41 *
11-215-00232 MS	86	39 *
11-215-00232 MSD	77	37 *
11-215-00234 MS	73	41 *
11-215-00234 MSD	75	36 *
11-215-00140 MS	77	44 *
11-215-00140 MSD	78	34 *

TCMX denotes Tetrachloro-m-xylene
DCBP denotes Decachlorobiphenyl

	Advisory QC Limits
TCMX	60-150
DCBP	60-150

Table 2.13 (Cont) Results of the Surrogate Recoveries for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers

Sample ID	Percent Recovery TCMX	Percent Recovery DCBP
MBLK 051597	27 *	75
11-215-00060	60	40 *
11-215-00061	55 *	46 *
11-215-00062	59 *	41 *
11-215-00063	60	38 *
11-215-00064	61	45 *
11-215-00071	74	37 *
11-215-00072	68	34 *
11-215-00073	64	42 *
11-215-00074	74	33 *
11-215-00075	63	31 *
11-215-00076	70	32 *
11-215-00077	71	50 *
11-215-00080	69	32 *
11-215-00081	62	32 *
11-215-00082	68	24 *
11-215-00083	68	50 *
11-215-00084	85	31 *
11-215-00085	81	44 *
11-215-00086	79	40 *
11-215-00087	69	52 *
MBLK 051697	23 *	70
11-215-00201	77	26 *
11-215-00202	85	22 *
11-215-00203	83	29 *
11-215-00204	78	29 *
11-215-00205	79	33 *
11-215-00206	95	30 *
11-215-00207	149	62
11-215-00208	79	28 *

TCMX denotes Tetrachloro-m-xylene
DCBP denotes Decachlorobiphenyl

	Advisory QC Limits
TCMX	60-150
DCBP	60-150

Table 2.14 Results of the BS/BSD Analysis for Pesticides/PCBs in Water
WA# 2-215 Avtex Fibers

Sample ID: WBLK051497

Compound	Sample Conc µg/L	BS Spike Added µg/L	BS Conc µg/L	BS % Rec	BSD Spike Added µg/L	BSD Conc µg/L	BSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	0.125	0.136	109	0.125	0.137	110	1	56-123	15
Heptachlor	U	0.125	0.140	112	0.125	0.141	113	1	40-131	20
Aldrin	U	0.125	0.123	98	0.125	0.129	103	5	40-120	22
Dieldrin	U	0.250	0.291	116	0.250	0.308	123	6	52-126	18
Endrin	U	0.250	0.424	170 *	0.250	0.434	174 *	2	56-121	21
p,p'-DDT	U	0.250	0.380	152 *	0.250	0.398	159 *	5	38-127	27

[redacted]

Table 2.15 Results of the MS/MSD Analysis for Pesticides/PCBs in Water
WA# 2-215 Avtex Fibers

Sample ID: B 11-215-00414

Compound	Sample Conc (µg/L)	MS Spike Added (µg/L)	MS Conc (µg/L)	MS % Rec	MSD Spike Added (µg/L)	MSD Conc (µg/L)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	0.125	0.088	70	0.125	0.088	70	0	56-123	15
Heptachlor	U	0.125	0.088	70	0.125	0.095	76	8	40-131	20
Aldrin	U	0.125	0.086	69	0.125	0.090	72	5	40-120	22
Dieldrin	U	0.250	0.193	77	0.250	0.188	75	3	52-126	18
Endrin	U	0.250	0.295	118	0.250	0.289	116	2	56-121	21
p,p'-DDT	U	0.250	0.266	106	0.250	0.242	97	9	38-127	27

Table 2.16 Results of the MS/MSD Analysis for Pesticides/PCBs in Soil
WA# 2-215 Avtex Fibers
Based on dry weight

Sample ID: A 11-215-00403

Compound	Sample Conc µg/kg	MS Spike Added µg/kg	MS Conc µg/kg	MS % Rec	MSD Spike Added µg/kg	MSD Conc µg/kg	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	25.946	16.875	65	25.946	11.971	46	34	46-127	50
Heptachlor	U	25.946	23.349	90	25.946	18.251	70	25	35-130	31
Aldrin	U	25.946	18.306	71	25.946	15.418	59	17	34-132	43
Dieldrin	U	51.892	40.307	78	51.892	35.096	68	14	31-134	38
Endrin	U	51.892	60.331	116	51.892	50.485	97	18	42-139	45
p,p'-DDT	U	51.892	24.879	48	51.892	16.028	31	43	23-134	50

Sample ID: 11-215-00505

Compound	Sample Conc µg/kg	MS Spike Added µg/kg	MS Conc µg/kg	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	26.057	4.500	17 *	26.057	6.500	25 *	36	46-127	50
Heptachlor	U	26.057	21.998	84	26.057	22.999	88	4	35-130	31
Aldrin	U	26.057	23.998	92	26.057	28.001	107	15	34-132	43
Dieldrin	U	52.115	82.001	157 *	52.115	99.813	192 *	20	31-134	38
Endrin	U	52.115	87.999	169 *	52.115	109.999	211 *	22	42-139	45
p,p'-DDT	U	52.115	U	NC	52.115	7.101	14 *	NC	23-134	50

Sample ID: A 11-215-00605

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	61.208	8.571	14 *	61.208	4.943	8 *	54 *	46-127	50
Heptachlor	U	61.208	25.303	41	61.208	13.770	22 *	59 *	35-130	31
Aldrin	U	61.208	44.358	72	61.208	30.772	50	36	34-132	43
Dieldrin	U	122.415	98.129	80	122.514	66.635	54	38	31-134	38
Endrin	U	122.415	125.075	102	122.415	73.191	60	52 *	42-139	45
p,p'-DDT	U	122.415	27.741	23 *	122.415	22.023	18 *	23	23-134	50

Table 2.17 Results of the MS/MSD Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Sample ID: 11-215-00201

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	90.777	53.395	59	90.777	56.449	62	6	46-127	50
Heptachlor	U	90.777	73.110	81	90.777	80.501	89	10	35-130	31
Aldrin	U	90.777	59.554	66	90.777	65.260	72	9	34-132	43
Dieldrin	U	181.554	119.431	66	181.554	133.082	73	11	31-134	38
Endrin	U	181.554	159.989	88	181.554	180.527	99	12	42-139	45
p,p'-DDT	U	181.554	86.213	47	181.554	98.172	54	13	23-134	50

Sample ID: 11-215-00100

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	86.685	61.933	71	89.286	58.666	66	8	46-127	50
Heptachlor	2.103	86.685	88.961	100	89.286	84.198	92	9	35-130	31
Aldrin	U	86.685	71.311	82	89.286	65.514	73	11	34-132	43
Dieldrin	U	173.370	165.103	95	178.571	166.659	93	2	31-134	38
Endrin	10.612	173.370	230.798	127	178.571	239.828	128	1	42-139	45
p,p'-DDT	U	173.370	184.677	107	178.571	194.829	109	2	23-134	50

Table 2.17 (Cont) Results of the MS/MSD Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Sample ID: 11-215-00133

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	147.059	96.489	66	147.059	102.847	70	6	46-127	50
Heptachlor	U	147.059	157.012	107	147.059	171.106	116	9	35-130	31
Aldrin	U	147.059	118.829	81	147.059	122.890	84	3	34-132	43
Dieldrin	U	294.118	277.061	94	294.118	289.023	98	4	31-134	38
Endrin	U	294.118	384.238	131	294.118	403.453	137	5	42-139	45
p,p'-DDT	U	294.118	257.031	87	294.118	266.098	90	3	23-134	50

Sample ID: 11-215-00238

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	99.206	64.042	65	99.206	65.973	67	3	46-127	50
Heptachlor	U	99.206	92.788	94	99.206	99.544	100	7	35-130	31
Aldrin	U	99.206	73.838	74	99.206	78.122	79	6	34-132	43
Dieldrin	U	198.413	168.332	85	198.413	173.629	88	3	31-134	38
Endrin	U	198.413	231.947	117	198.413	249.347	126	7	42-139	45
p,p'-DDT	U	198.413	146.005	74	198.413	152.703	77	4	23-134	50

Table 2.17 (Cont) Results of the MS/MSD Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Sample ID: 11-215-00065

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	111.408	68.555	62	111.408	63.875	57	7	46-127	50
Heptachlor	5.791	111.408	98.043	83	111.408	88.227	74	11	35-130	31
Aldrin	5.558	111.408	83.382	70	111.408	77.303	64	8	34-132	43
Dieldrin	U	228.816	215.162	94	228.816	191.790	84	11	31-134	38
Endrin	U	228.816	324.654	142 *	228.816	281.350	123	14	42-139	45
p,p'-DDT	U	228.816	195.588	85	228.816	159.750	70	20	23-134	50

Sample ID: 11-215-00070

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	81.913	51.283	63	85.852	57.886	67	7	46-127	50
Heptachlor	U	81.913	77.471	95	85.852	89.027	104	9	35-130	31
Aldrin	U	81.913	62.494	76	85.852	71.673	83	9	34-132	43
Dieldrin	7.578	163.827	155.099	90	171.700	162.598	90	0	31-134	38
Endrin	U	163.827	215.738	132	171.700	232.322	135	3	42-139	45
p,p'-DDT	U	163.827	162.850	99	171.700	164.479	96	4	23-134	50

Table 2.17 (Cont) Results of the MS/MSD Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Sample ID: 11-215-00115

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	100.644	64.331	64	102.543	67.284	66	3	46-127	50
Heptachlor	3.729	100.644	102.561	98	102.543	109.936	104	5	35-130	31
Aldrin	U	100.644	80.538	80	102.543	86.324	84	5	34-132	43
Dieldrin	U	201.288	177.911	88	205.086	170.549	83	6	31-134	38
Endrin	U	201.288	243.810	121	205.086	233.209	114	6	42-139	45
p,p'-DDT	U	201.288	735.031	365 *	205.086	790.604	385 *	5	23-134	50

* High recovery is due to matrix interference

Sample ID: 11-215-00232

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	83.333	50.067	60	82.508	44.691	54	10	46-127	50
Heptachlor	U	83.333	71.966	86	82.508	64.767	78	10	35-130	31
Aldrin	U	83.333	56.678	68	82.508	52.319	63	7	34-132	43
Dieldrin	U	166.667	110.275	66	165.016	98.260	60	11	31-134	38
Endrin	U	166.667	145.945	88	165.016	132.119	80	9	42-139	45
p,p'-DDT	U	166.667	91.807	55	165.016	77.009	47	17	23-134	50

Table 2.17 (Cont) Results of the MS/MSD Analysis for Pesticides/PCBs in Tissue
WA # 2-215 Avtex Fibers Site
Based on dry weight

Sample ID: 11-215-00234

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	2.768	104.167	67.660	62	100.160	64.942	62	0	46-127	50
Heptachlor	U	104.167	100.804	97	100.160	97.366	97	0	35-130	31
Aldrin	U	104.167	80.240	77	100.160	77.788	78	1	34-132	43
Dieldrin	U	208.333	174.188	84	200.320	164.489	82	2	31-134	38
Endrin	U	208.333	245.796	118	200.320	229.933	115	3	42-139	45
p,p'-DDT	U	208.333	131.236	63	200.320	114.142	57	10	23-134	50

* High recovery is due to matrix interference

Sample ID: 11-215-00140

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	MS Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	108.696	63.474	58	106.564	60.228	57	3	46-127	50
Heptachlor	U	108.696	118.525	109	106.564	111.924	105	4	35-130	31
Aldrin	U	108.696	85.392	79	106.564	83.977	79	0	34-132	43
Dieldrin	U	217.391	185.221	85	213.129	170.062	80	7	31-134	38
Endrin	U	217.391	306.571	141	213.129	243.782	114	21	42-139	45
p,p'-DDT	U	217.391	136.247	63	213.129	119.377	56	11	23-134	50

QC standards TMWS, QC-7x100, QC-21x100, ERA-431, TMMA #1 and TMMA #2 were used to check the accuracy of the calibration curve. The percent recoveries for TAL metals in the water samples ranged from 93 to 107 and all recovered concentrations for which confidence limits are available were within the 95% confidence limits. The recoveries are listed in Table 2.18. The 95% confidence limits for 17 values are not available.

Samples 11-215-00046 and 11-215-00414 were chosen for matrix spike/matrix spike duplicate (MS/MSD) analyses for TAL metals in the water samples. The percent recoveries, listed in Table 2.19, ranged from 27 to 107. Seventy out of seventy-six values were within the acceptable QC limits. The relative percent differences (RPDs), also listed in Table 2.19, ranged from 0 (zero) to 15 and all thirty-eight values were within the acceptable QC limits.

The results of the blank spike analysis for TAL metals in the water samples are reported in Table 2.20. The percent recoveries ranged from 95 to 114 and all twenty-three values were within the acceptable QC limits.

The percent recoveries of the QC standards for TAL metals in the soil samples ranged from 90 to 113 and all recovered concentrations for which confidence limits are available were within the 95% confidence limits. The recoveries are listed in Table 2.21. The 95% confidence limits for 19 values are not available.

Samples 11-215-00605 and 11-215-00505 were chosen for the MS/MSD analyses for TAL metals in the soil samples. The percent recoveries, listed in Table 2.22, ranged from 15 to 150. Four values were not calculated because the concentration of analyte spiked was less than that contained in the sample. The RPDs, also listed in Table 2.22, ranged from 0 (zero) to 71. Two values were not calculated because the concentration of analyte spiked was less than that contained in the sample. QC limits for percent recoveries and RPDs are not available for this analysis.

The results of the blank spike analysis for TAL metals in the soil samples are reported in Table 2.23. The percent recoveries ranged from 83 to 113. QC limits are not available for this analysis.

The percent recoveries of the QC standards for TAL metals in the tissue samples ranged from 93 to 112 and all recovered concentrations for which confidence limits are available were within the 95% confidence limits. The recoveries are listed in Table 2.24. The 95% confidence limits for 68 values are not available.

Samples 11-215-00065, 11-215-00070, 11-215-00206, 11-215-00217, 11-215-00234, 11-215-00100, 11-215-00112, 11-215-00066, 11-215-00231, 11-215-00136 and 11-215-00237 were chosen for the MS/MSD analyses for TAL metals in the tissue samples. The percent recoveries, listed in Table 2.25, ranged from 50 to 111. Four values were not calculated because the concentration of analyte spiked was less than that contained in the sample. The RPDs, also listed in Table 2.25, ranged from 0 (zero) to 34. Two values were not calculated because the concentration of analyte spiked was less than that contained in the sample. QC limits for percent recoveries and RPDs are not available for this analysis.

The results of the blank spike analysis for TAL metals in the tissue samples are reported in Table 2.26. The percent recoveries ranged from 81 to 113. QC limits are not available for this analysis.

The percent recoveries of the QC standards for metals in the soil samples ranged from 103 to 110 and all recovered concentrations for which confidence limits are available were within the 95% confidence limits. The recoveries are listed in Table 2.27. The 95% confidence limits for seven values are not available.

Samples I4 and XRF34 were chosen for the MS/MSD analyses for metals in the soil samples. The percent recoveries, listed in Table 2.28, ranged from 78 to 119. The RPDs, also listed in Table 2.28, ranged from 1 to 13. QC limits for percent recoveries and RPDs are not available for this analysis.

The results of the blank spike analysis for metals in the soil samples are reported in Table 2.29. The percent recoveries ranged from 93 to 102. QC limits are not available for this analysis.

Table 2.18 Results of the QC Standard Analysis for TAL Metals in Water
WA # 2-215 Avtex Fibers

Metal	Date Analyzed	Quality Control Standard	Conc. Recovered µg/L	True Value µg/L	95% Confidence Interval	% Rec
Aluminum	05/28/97	QC-7 x100	1011	1000	NA	101
		ERA-431	435	441	362 - 520	99
Antimony	05/29/97	TMAA#2	103	100	81.65 - 125.67	103
Arsenic	05/29/97	TMAA #1	50	50	41.9-55.9	100
Barium	05/28/97	QC-7 x100	1021	1000	NA	102
		ERA-431	410	406	333 - 479	101
Beryllium	05/28/97	QC-21 x100	1035	1000	NA	104
		ERA-431	107	103	85 - 122	104
Cadmium	05/28/97	QC-21 x100	1035	1000	NA	104
		ERA-431	83	82	67 - 97	101
Calcium	05/28/97	QC-21 x100	1062	1000	NA	106
Chromium	05/28/97	QC-21 x100	1054	1000	NA	105
		ERA-431	554	529	434 - 624	105
Cobalt	05/28/97	QC-21 x100	1051	1000	NA	105
		ERA-431	473	447	367 - 527	106
Copper	05/28/97	QC-21 x100	1027	1000	NA	103
		ERA-431	213	208	171 - 245	102
Iron	05/28/97	QC-21 x100	1053	1000	NA	105
		ERA-431	709	676	554 - 798	105
Lead	05/29/97	TMAA#1	50.2	50	43.4 - 56.3	100
	06/02/97	TMAA#1	51	50	43.4 - 56.3	102
Magnesium	05/28/97	QC-21 x100	1024	1000	NA	102
Manganese	05/28/97	QC-21 x100	1051	1000	NA	105
		ERA-431	534	518	425 - 611	103
Mercury	05/30/97	TMWS	2.80	3.00	2.21 - 3.65	93
Nickel	05/28/97	QC-21 x100	1068	1000	NA	107
		ERA-431	99	94	77 - 111	105
Potassium	05/28/97	QC-7 x100	9950	10000	NA	100
Selenium	05/30/97	TMAA #1	51.85	50	39.4-57.4	104
Silver	05/28/97	QC-7 x100	1019	1000	NA	102
		ERA-431	66	65	53 - 76	102
Sodium	05/28/97	QC-7 x100	982	1000	NA	98
Thallium	05/30/97	TMAA #2	49.6	50	39.9-57.97	99
Vanadium	05/28/97	QC-21 x100	1024	1000	NA	102
		ERA-431	343	338	277 - 399	101
Zinc	05/28/97	QC-21 x100	1030	1000	NA	103
		ERA-431	438	424	348 - 500	103

Table 2.19 Results of the MS/MSD Analysis for TAL Metals in Water
WA # 2-215 Avtex Fibers

Metal	Client #	Sample Conc. µg/L	Original Conc. Spike µg/L	Original Conc. Dup. µg/L	Recovered Conc. Spike µg/L	Recovered Conc. Dup. µg/L	% Recovery Spike	% Recovery Dup.	RPD	Recommended Limit % Rec	Recommended Limit RPD
Aluminum	11-215-00046	31.3	4444	4444	4329	4362	97	97	1	75-125	20
Antimony	11-215-00046	1	55.6	55.6	53.5	60.6	95	107	13	75-125	20
Arsenic	11-215-00046	1	55.6	55.6	51.1	54.3	90	96	6	75-125	20
Barium	11-215-00046	65.6	556	556	609	605	98	97	1	75-125	20
Beryllium	11-215-00046	0.1	222	222	223	224	100	101	0	75-125	20
Cadmium	11-215-00046	U	222	222	215	217	97	98	1	75-125	20
Chromium	11-215-00046	1.4	222	222	222	223	99	100	0	75-125	20
Cobalt	11-215-00046	U	222	222	223	225	100	101	1	75-125	20
Copper	11-215-00046	U	222	222	220	221	99	99	0	75-125	20
Iron	11-215-00046	37.2	4444	4444	4471	4470	100	100	0	75-125	20
Lead	11-215-00046	U	55.6	55.6	52.9	55.3	95	100	4	75-125	20
Manganese	11-215-00046	7	222	222	225	225	98	98	0	75-125	20
Mercury	11-215-00046	U	2.00	2.00	1.9	1.9	95	95	0	75-125	20
Nickel	11-215-00046	2.2	222	222	225	229	100	102	2	75-125	20
Selenium	11-215-00046	0.6	55.6	55.6	37	38.7	66 *	69 *	5	75-125	20
Silver	11-215-00046	0.5	222	222	61.4	61.6	27 *	27 *	0	75-125	20
Thallium	11-215-00046	U	55.6	55.6	55.6	59	100	106	6	75-125	20
Vanadium	11-215-00046	U	556	556	548	549	99	99	0	75-125	20
Zinc	11-215-00046	116	222	222	332	333	97	98	0	75-125	20

Table 2.19 (Cont) Results of the MS/MSD Analysis for TAL Metals in Water
WA # 2-215 Avtex Fibers

Metal	Client #	Sample Conc. µg/L	Original Conc. Spike µg/L	Original Conc. Dup. µg/L	Recovered Conc. Spike µg/L	Recovered Conc. Dup. µg/L	% Recovery Spike	% Recovery Dup.	RPD	Recommended Limit % Rec	Recommended Limit RPD
Aluminum	11-215-00414	22	4444	4444	4382	4270	98	96	3	75-125	20
Antimony	11-215-00414	U	55.6	55.6	53.2	59.6	96	107	11	75-125	20
Arsenic	11-215-00414	U	55.6	55.6	55.9	57.1	101	103	2	75-125	20
Barium	11-215-00414	33	556	556	585	569	99	96	3	75-125	20
Beryllium	11-215-00414	0.1	222	222	227	222	102	100	2	75-125	20
Cadmium	11-215-00414	U	222	222	218	212	98	95	3	75-125	20
Chromium	11-215-00414	1.8	222	222	225	220	100	98	2	75-125	20
Cobalt	11-215-00414	0.3	222	222	226	221	102	99	2	75-125	20
Copper	11-215-00414	1.4	222	222	225	219	101	98	3	75-125	20
Iron	11-215-00414	63	4444	4444	4566	4445	101	99	3	75-125	20
Lead	11-215-00414	U	55.6	55.6	49.6	51.4	89	93	4	75-125	20
Manganese	11-215-00414	7.2	222	222	231	225	101	98	3	75-125	20
Mercury	11-215-00414	U	2.00	2.00	2.00	2.00	100	100	0	75-125	20
Nickel	11-215-00414	U	222	222	222	217	100	98	2	75-125	20
Selenium	11-215-00414	0.4	55.6	55.6	52.4	61	94	109	15	75-125	20
Silver	11-215-00414	3.6	222	222	101	109	44 *	47 *	8	75-125	20
Thallium	11-215-00414	U	55.6	55.6	57.3	59.3	103	107	3	75-125	20
Vanadium	11-215-00414	2.2	556	556	554	541	99	97	2	75-125	20
Zinc	11-215-00414	U	222	222	217	212	98	95	2	75-125	20

Table 2.20 Results of the Blank Spike Analysis for TAL Metals in Water
WA # 2-215 Avtex Fibers

Metal	Spiked Conc µg/L	Recovered Conc. µg/L	% Rec	Recommended Limit
Aluminum	4444	4268	96	75-125
Antimony	55.6	58.7	106	75-125
Arsenic	55.6	55.6	100	75-125
Barium	556	542	98	75-125
Beryllium	222	222	100	75-125
Cadmium	222	212	95	75-125
Calcium	4444	4303	97	75-125
Chromium	222	221	99	75-125
Cobalt	222	225	101	75-125
Copper	222	219	99	75-125
Iron	4444	4426	100	75-125
Lead	55.6	56.4	102	75-125
Magnesium	4444	4293	97	75-125
Manganese	222	219	99	75-125
Mercury	2.00	2	100	75-125
Nickel	222	222	100	75-125
Potassium	4444	4326	97	75-125
Selenium	55.6	63.3	114	75-125
Silver	222	213	96	75-125
Sodium	4444	4204	95	75-125
Thallium	55.6	59.4	107	75-125
Vanadium	556	545	98	75-125
Zinc	222	212	95	75-125

Table 2.21 Results of the QC Standard Analysis for TAL Metals (Soil)
WA # 2-215 Avtex Fibers

Metal	Date Analyzed	Quality Control Standard	Conc. Rec µg/L	True Value µg/L	95 % Confidence Interval	% Rec
Aluminum	06/02/97	QC-7 x100	1010	1000	NA	101
	06/02/97	ERA-431	475	441	362 - 520	108
Antimony	06/02/97	QC-21 x100	1024	1000	NA	102
Arsenic	06/03/97	TMMA #1	51	50	41.9-55.9	102
	06/04/97	TMMA #1	54	50	41.9-55.9	108
Barium	06/02/97	QC-7 x100	1029	1000	NA	103
	06/02/97	ERA-431	420	406	333 - 479	103
Beryllium	06/02/97	QC-21 x100	1055	1000	NA	106
	06/02/97	ERA-431	109	103	85 - 122	106
Cadmium	06/02/97	QC-21 x100	1060	1000	NA	106
	06/02/97	ERA-431	85.6	82	67 - 97	104
Calcium	06/02/97	QC-21 x100	1088	1000	NA	109
Chromium	06/02/97	QC-21 x100	1092	1000	NA	109
	06/02/97	ERA-431	580	529	434 - 624	110
Cobalt	06/02/97	QC-21 x100	1085	1000	NA	109
	06/02/97	ERA-431	496	447	367 - 527	111
Copper	06/02/97	QC-21 x100	1042	1000	NA	104
	06/02/97	ERA-431	217	208	171 - 245	104
Iron	06/02/97	QC-21 x100	1091	1000	NA	109
	06/02/97	ERA-431	742	676	554 - 798	110
Lead	06/02/97	QC-21 x100	1088	1000	NA	109
	06/02/97	ERA-431	389	353	289 - 417	110
Magnesium	06/02/97	QC-21 x100	1046	1000	NA	105
Manganese	06/02/97	QC-21 x100	1078	1000	NA	108
	06/02/97	ERA-431	553	518	425 - 611	107
Mercury	06/02/97	TMWS	2.8	3	2.21-3.65	93
Nickel	06/02/97	QC-21 x100	1114	1000	NA	111
	06/02/97	ERA-431	106	94	77 - 111	113
Potassium	06/02/97	QC-7 x100	9034	10000	NA	90
Selenium	05/30/97	TMMA #1	50.7	50	39.4-57.4	101
	06/04/97	TMMA #1	50.2	50	39.4-57.4	100
Silver	06/02/97	QC-7 x100	1026	1000	NA	103
	06/02/97	ERA-431	67.5	65	53 - 76	104
Sodium	06/02/97	QC-7 x100	996	1000	NA	100
Thallium	06/04/97	TMMA #2	49	50	39.9-57.97	98
	005/97	TMMA #2	48	50	39.9-57.97	96
Vanadium	06/02/97	QC-21 x100	1067	1000	NA	107
	06/02/97	ERA-431	362	338	277 - 399	107
Zinc	06/02/97	QC-21 x100	1057	1000	NA	106
	06/02/97	ERA-431	454	424	348 - 500	107

Table 2.22 Results of the MS/MSD Analysis for TAL Metals in Soil
WA # 2-215 Avtex Fibers
(based on dry weight)

Metal	Client #	Sample Conc. mg/kg	Original Conc. Spike mg/kg	Original Conc. Dup. mg/kg	Recovered Conc. Spike mg/kg	Recovered Conc. Dup. mg/kg	% Recovery Spike	% Recovery Dup.	RPD
Antimony	11-215-00605	11.3	78.0	87.1	33.6	24	29	15	65
Antimony	11-215-00505	0.101	53.2	56.6	14.5	8.89	27	16	54
Arsenic	11-215-00605	7.53	8.16	10.01	13.2	15.8	69	83	17
Arsenic	11-215-00505	3.69	6.04	5.19	7.97	8.51	71	93	27
Barium	11-215-00605	95.8	156	174	250	280	99	106	7
Barium	11-215-00505	116	106	113	229	236	106	106	0
Beryllium	11-215-00605	0.791	78.0	87.1	75.6	87.6	96	100	4
Beryllium	11-215-00505	1.17	53.2	56.6	58	61.4	107	106	0
Cadmium	11-215-00605	3.59	78.0	87.1	75.2	88.7	92	98	6
Cadmium	11-215-00505	0.248	53.2	56.6	53	56.8	99	100	1
Chromium	11-215-00605	44.4	78.0	87.1	120	134	97	103	6
Chromium	11-215-00505	15.2	53.2	56.6	70.8	75.6	104	107	2
Cobalt	11-215-00605	10.7	78.0	87.1	82.3	96	92	98	6
Cobalt	11-215-00505	16.7	53.2	56.6	72.5	76.4	105	106	1
Copper	11-215-00605	42.8	78.0	87.1	120	131	99	101	2
Copper	11-215-00505	15.6	53.2	56.6	70.6	73.2	103	102	1
Lead	11-215-00605	121	78.0	87.1	193	207	92	99	7
Lead	11-215-00505	24.5	53.2	56.6	79.2	81.9	103	101	1
Manganese	11-215-00605	691	78.0	87.1	790	822	127	150	17
Manganese	11-215-00505	1121	53.2	56.6	1184	1153	118	57	71
Mercury	11-215-00605	1.08	0.843	0.697	1.85	1.74	91	95	4
Mercury	11-215-00505	0.344	0.433	0.449	0.715	0.875	86	118	32
Nickel	11-215-00605	25.1	78.0	87.1	97.5	113	93	101	8
Nickel	11-215-00505	13.3	53.2	56.6	69.6	73.8	106	107	1
Selenium	11-215-00605	U	8.16	10.01	2.66	3.84	33	38	16
Selenium	11-215-00505	0.036	6.04	5.19	1.99	1.93	32	36	12
Silver	11-215-00605	0.05	78.0	87.1	70.3	82.8	90	95	5
Silver	11-215-00505	U	53.2	56.6	51.5	54.9	97	97	0
Thallium	11-215-00605	0.342	8.16	10.01	4.57	6.21	52	59	12
Thallium	11-215-00505	0.461	6.04	5.19	3.87	4.15	56	71	23
Vanadium	11-215-00605	24.9	156	174	171	199	94	100	6
Vanadium	11-215-00505	36.5	106	113	146	152	103	102	1
Zinc	11-215-00605	27211	78.0	87.1	28182	29108	NC	NC	NC
Zinc	11-215-00505	715	53.2	56.6	791	649	NC	NC	NC

Table 2.23 Results of the Blank Spike Analysis for TAL Metals in Soil
WA # 2-215 Avtex Fibers

Metal	Spiked Conc mg/kg	Sand Blk Conc mg/kg	Rec Conc. mg/kg	% Rec
Aluminum	800	U	819	102
Antimony	50.0	U	48.6	97
Arsenic	4.90	U	4.8	98
Barium	100	U	100	100
Beryllium	50.0	U	53	106
Cadmium	50.0	U	50.4	101
Calcium	800	U	817	102
Chromium	50.0	U	52.3	105
Cobalt	50.0	U	52.5	105
Copper	50.0	U	50.7	101
Iron	800	U	835	104
Lead	50.0	U	52	104
Magnesium	800	U	796	100
Manganese	50.0	U	51.6	103
Mercury	0.400	NA	0.38	95
Nickel	50.0	U	53.5	107
Potassium	800	U	727	91
Selenium	4.90	U	4.5	92
Silver	50.0	U	48.8	98
Sodium	800	U	789	99
Thallium	4.90	U	4.2	86
Vanadium	100	U	103	103
Zinc	50.0	U	52.2	104

Table 2.23 (Cont) Results of the Blank Spike Analysis for TAL Metals in Soil
WA # 2-215 Avtex Fibers

Metal	Spiked Conc mg/kg	Sand Blk Conc mg/kg	Rec Conc. mg/kg	% Rec
Aluminum	784	U	842	107
Antimony	49.0	U	50.5	103
Arsenic	4.81	U	4.9	102
Barium	98	U	103	105
Beryllium	49.0	U	54.6	111
Cadmium	49.0	U	52.9	108
Calcium	784	U	866	110
Chromium	49.0	U	54.8	112
Cobalt	49.0	U	54.7	112
Copper	49.0	U	52.1	106
Iron	784	U	881	112
Lead	49.0	U	53.8	110
Magnesium	784	U	830	106
Manganese	49.0	U	54.2	111
Nickel	49.0	U	55.2	113
Potassium	784	U	765	98
Selenium	4.81	U	4.8	100
Silver	49.0	U	50.8	104
Sodium	784	U	800	102
Thallium	4.81	U	4	83
Vanadium	98	U	107	109
Zinc	49.0	U	55.1	112

Table 2.24 Results of the QC Standard Analysis for TAL Metals (Tissue)
WA # 2-215 Avtex Fibers

Metal	Date Analyzed	Quality Control Standard	Conc. Rec µg/L	True Value µg/L	95 % Confidence Interval	% Rec
Aluminum	05/20/97	QC-7 x100	1015	1000	NA	102
	05/20/97	ERA-431	441	441	362 - 520	100
Antimony	05/23/97	TMMA#2	101.1	100	81.65 - 125.67	101
Arsenic	05/21/97	TMMA #1	50.2	50	41.9-55.9	100
Barium	05/20/97	QC-7 x100	1015	1000	NA	102
	05/20/97	ERA-431	411	406	333 - 479	101
Beryllium	05/20/97	QC-21 x100	1030	1000	NA	103
	05/20/97	ERA-431	106	103	85 - 122	103
Cadmium	05/20/97	QC-21 x100	1031	1000	NA	103
	05/20/97	ERA-431	83	82	67 - 97	101
Calcium	05/20/97	QC-21 x100	1069	1000	NA	107
Chromium	05/20/97	QC-21 x100	1051	1000	NA	105
	05/20/97	ERA-431	549	529	434 - 624	104
Cobalt	05/20/97	QC-21 x100	1043	1000	NA	104
	05/20/97	ERA-431	472	447	367 - 527	106
Copper	05/20/97	QC-21 x100	1029	1000	NA	103
	05/20/97	ERA-431	213	208	171 - 245	102
Iron	05/20/97	QC-21 x100	1058	1000	NA	106
	05/20/97	ERA-431	713	676	554 - 798	105
Lead	05/19/97	TMMA#1	51	50	43.4 - 56.3	102
Magnesium	05/20/97	QC-21 x100	1021	1000	NA	102
Manganese	05/20/97	QC-21 x100	1046	1000	NA	105
	05/20/97	ERA-431	531	518	425 - 611	103
Mercury	05/16/97	TMWS	2.9	3	2.21 - 3.65	97
Nickel	05/20/97	QC-21 x100	1061	1000	NA	106
	05/20/97	ERA-431	98	94	77 - 111	104
Potassium	05/20/97	QC-7 x100	9772	10000	NA	98
Selenium	05/16/97	TMMA #1	51.9	50	39.4-57.4	104
	05/16/97	TMMA #1	51.5	50	39.4-57.4	103
Silver	05/20/97	QC-7 x100	1014	1000	NA	101
	05/20/97	ERA-431	66	65	53 - 76	102
Sodium	05/20/97	QC-7 x100	993	1000	NA	99
Thallium	05/19/97	TMMA #2	49.1	50	39.9-57.97	98
Vanadium	05/20/97	QC-21 x100	1026	1000	NA	103
	05/20/97	ERA-431	343	338	277 - 399	101
Zinc	05/20/97	QC-21 x100	1029	1000	NA	103
	05/20/97	ERA-431	438	424	348 - 500	103

Table 2.24 (Cont) Results of the QC Standard Analysis for TAL Metals (Tissue)
WA # 2-215 Avtex Fibers

Metal	Date Analyzed	Quality Control Standard	Conc. Rec µg/L	True Value µg/L	95 % Confidence Interval	% Rec
Aluminum	05/21/97	QC-7 x100	1019	1000	NA	102
	05/21/97	ERA-431	455	441	362 - 520	103
Antimony	05/23/97	TMMA#2	93.1	100	81.65 - 125.67	93
Arsenic	05/22/97	TMMA #1	49.8	50	41.9-55.9	100
Barium	05/21/97	QC-7 x100	1011	1000	NA	101
	05/21/97	ERA-431	415	406	333 - 479	102
Beryllium	05/21/97	QC-21 x100	1017	1000	NA	102
	05/21/97	ERA-431	106	103	85 - 122	103
Cadmium	05/21/97	QC-21 x100	1014	1000	NA	101
	05/21/97	ERA-431	84	82	67 - 97	102
Calcium	05/21/97	QC-21 x100	1051	1000	NA	105
Chromium	05/21/97	QC-21 x100	1031	1000	NA	103
	05/21/97	ERA-431	551	529	434 - 624	104
Cobalt	05/21/97	QC-21 x100	1026	1000	NA	103
	05/21/97	ERA-431	470	447	367 - 527	105
Copper	05/21/97	QC-21 x100	1017	1000	NA	102
	05/21/97	ERA-431	215	208	171 - 245	103
Iron	05/21/97	QC-21 x100	1043	1000	NA	104
	05/21/97	ERA-431	711	676	554 - 798	105
Lead	05/23/97	TMMA#1	51.1	50	43.4 - 56.3	102
Magnesium	05/21/97	QC-21 x100	1036	1000	NA	104
Manganese	05/21/97	QC-21 x100	1029	1000	NA	103
	05/21/97	ERA-431	528	518	425 - 611	102
Mercury	05/16/97	TMWS	2.9	3.00	2.21 - 3.65	97
Nickel	05/21/97	QC-21 x100	1033	1000	NA	103
	05/21/97	ERA-431	101	94	77 - 111	107
Potassium	05/21/97	QC-7 x100	9827	10000	NA	98
Selenium	05/23/97	TMMA #1	52.66	50	39.4-57.4	105
Silver	05/21/97	QC-7 x100	1009	1000	NA	101
	05/21/97	ERA-431	64	65	53 - 76	98
Sodium	05/21/97	QC-7 x100	997	1000	NA	100
Thallium	05/27/97	TMMA #2	49.03	50	39.9-57.97	98
Vanadium	05/21/97	QC-21 x100	1008	1000	NA	101
	05/21/97	ERA-431	343	338	277 - 399	101
Zinc	05/21/97	QC-21 x100	1012	1000	NA	101
	05/21/97	ERA-431	435	424	348 - 500	103

Table 2.24 (Cont) Results of the QC Standard Analysis for TAL Metals (Tissue)
WA # 2-215 Avtex Fibers

Metal	Date Analyzed	Quality Control Standard	Conc. Rec µg/L	True Value µg/L	95 % Confidence Interval	% Rec
Aluminum	05/22/97	QC-7 x100	996	1000	NA	100
	05/22/97	ERA-431	441	441	362 - 520	100
Antimony	05/21/97	TMMA#2	111.3	100	81.65 - 125.67	111
	05/22/97	TMMA#2	111.9	100	81.65 - 125.67	112
Arsenic	05/23/97	TMMA #1	51.04	50	41.9-55.9	102
Barium	05/22/97	QC-7 x100	1010	1000	NA	101
	05/22/97	ERA-431	410	406	333 - 479	101
Beryllium	05/22/97	QC-21 x100	1020	1000	NA	102
	05/22/97	ERA-431	106	103	85 - 122	103
Cadmium	05/22/97	QC-21 x100	1026	1000	NA	103
	05/22/97	ERA-431	84	82	67 - 97	102
Calcium	05/22/97	QC-21 x100	1051	1000	NA	105
Chromium	05/22/97	QC-21 x100	1040	1000	NA	104
	05/22/97	ERA-431	550	529	434 - 624	104
Cobalt	05/22/97	QC-21 x100	1036	1000	NA	104
	05/22/97	ERA-431	475	447	367 - 527	106
Copper	05/22/97	QC-21 x100	1018	1000	NA	102
	05/22/97	ERA-431	212	208	171 - 245	102
Iron	05/22/97	QC-21 x100	1039	1000	NA	104
	05/22/97	ERA-431	705	676	554 - 798	104
Lead	05/21/97	TMMA#1	49.1	50	43.4 - 56.3	98
Magnesium	05/22/97	QC-21 x100	1010	1000	NA	101
Manganese	05/22/97	QC-21 x100	1038	1000	NA	104
	05/22/97	ERA-431	531	518	425 - 611	103
Mercury	05/20/97	TMWS	2.9	3.00	2.21 - 3.65	97
Nickel	05/22/97	QC-21 x100	1052	1000	NA	105
	05/22/97	ERA-431	101	94	77 - 111	107
Potassium	05/22/97	QC-7 x100	9763	10000	NA	98
Selenium	05/21/97	TMMA #1	49.48	50	39.4-57.4	99
Silver	05/22/97	QC-7 x100	1014	1000	NA	101
	05/22/97	ERA-431	62	65	53 - 76	95
Sodium	05/22/97	QC-7 x100	974	1000	NA	97
Thallium	05/23/97	TMMA #2	49.9	50	39.9-57.97	100
Vanadium	05/22/97	QC-21 x100	1011	1000	NA	101
	05/22/97	ERA-431	343	338	277 - 399	101
Zinc	05/22/97	QC-21 x100	1018	1000	NA	102
	05/22/97	ERA-431	433	424	348 - 500	102

Table 2.24 (Cont) Results of the QC Standard Analysis for TAL Metals (Tissue)
WA # 2-215 Avtex Fibers

Metal	Date Analyzed	Quality Control Standard	Conc. Rec µg/L	True Value µg/L	95 % Confidence Interval	% Rec
Aluminum	05/27/97	QC-7 x100	1016	1000	NA	102
	05/27/97	ERA-431	441	441	362 - 520	100
Antimony	05/29/97	TMMA#2	104.4	100	81.65 - 125.67	104
Arsenic	05/28/97	TMMA #1	51.1	50	41.9-55.9	102
Barium	05/27/97	QC-7 x100	1014	1000	NA	101
	05/27/97	ERA-431	407	406	333 - 479	100
Beryllium	05/27/97	QC-21 x100	1020	1000	NA	102
	05/27/97	ERA-431	106	103	85 - 122	103
Cadmium	05/27/97	QC-21 x100	1021	1000	NA	102
	05/27/97	ERA-431	84	82	67 - 97	102
Calcium	05/27/97	QC-21 x100	1031	1000	NA	103
Chromium	05/27/97	QC-21 x100	1041	1000	NA	104
	05/27/97	ERA-431	547	529	434 - 624	103
Cobalt	05/27/97	QC-21 x100	1034	1000	NA	103
	05/27/97	ERA-431	468	447	367 - 527	105
Copper	05/27/97	QC-21 x100	1021	1000	NA	102
	05/27/97	ERA-431	212	208	171 - 245	102
Iron	05/27/97	QC-21 x100	1033	1000	NA	103
	05/27/97	ERA-431	697	676	554 - 798	103
Lead	05/28/97	TMMA#1	48.4	50	43.4 - 56.3	97
Magnesium	05/27/97	QC-21 x100	1005	1000	NA	101
Manganese	05/27/97	QC-21 x100	1034	1000	NA	103
	05/27/97	ERA-431	526	518	425 - 611	102
Mercury	05/22/97	TMWS	2.9	3.00	2.21 - 3.65	97
Nickel	05/27/97	QC-21 x100	1055	1000	NA	106
	05/27/97	ERA-431	97	94	77 - 111	103
Potassium	05/27/97	QC-7 x100	9467	10000	NA	95
Selenium	05/28/97	TMMA #1	49.54	50	39.4-57.4	99
Silver	05/27/97	QC-7 x100	1013	1000	NA	101
	05/27/97	ERA-431	65	65	53 - 76	100
Sodium	05/27/97	QC-7 x100	985	1000	NA	99
Thallium	05/28/97	TMMA #2	48.62	50	39.9-57.97	97
Vanadium	05/27/97	QC-21 x100	1009	1000	NA	101
	05/27/97	ERA-431	337	338	277 - 399	100
Zinc	05/27/97	QC-21 x100	1019	1000	NA	102
	05/27/97	ERA-431	434	424	348 - 500	102

Table 2.25 Results of the MS/MSD Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
(based on dry weight)

Metal	Client #	Sample Conc. mg/kg	Original Conc. Spike mg/kg	Original Conc. Dup. mg/kg	Recovered Conc. Spike mg/kg	Recovered Conc. Dup. mg/kg	% Recovery Spike	% Recovery Dup.	RPD
Antimony	11-215-00065	0.191	9.40	6.37	10.6	6.88	111	105	5
Antimony	11-215-00070	0.084	6.03	6.20	6.37	6.45	104	103	2
Arsenic	11-215-00065	0.229	9.40	6.37	6.92	4.18	71	62	14
Arsenic	11-215-00070	0.335	6.03	6.20	4.39	4.52	67	67	0
Barium	11-215-00065	9.41	37.6	25.5	44.7	34.5	94	98	5
Barium	11-215-00070	2.64	24.1	24.8	25.0	24.9	93	90	3
Beryllium	11-215-00065	0.033	37.6	25.5	33.0	22.0	88	86	2
Beryllium	11-215-00070	0.012	24.1	24.8	21.6	21.5	89	87	3
Cadmium	11-215-00065	0.31	37.6	25.5	30.2	20.8	80	80	1
Cadmium	11-215-00070	U	24.1	24.8	19.7	19.7	82	79	3
Chromium	11-215-00065	1.98	37.6	25.5	33.0	23.4	83	84	2
Chromium	11-215-00070	1	24.1	24.8	21.7	21.5	86	83	4
Cobalt	11-215-00065	U	37.6	25.5	30.5	20.2	81	79	2
Cobalt	11-215-00070	U	24.1	24.8	20.2	19.6	84	79	6
Copper	11-215-00065	6.31	37.6	25.5	39.2	28.2	88	86	2
Copper	11-215-00070	10.5	24.1	24.8	23.8	24.2	55	55	0
Lead	11-215-00065	0.038	9.40	6.37	8.23	5.88	87	92	5
Lead	11-215-00070	0.028	6.03	6.20	5.38	5.53	89	89	0
Manganese	11-215-00065	5.54	37.6	25.5	37.7	27.5	86	86	1
Manganese	11-215-00070	8.75	24.1	24.8	30.5	31.0	90	90	1
Mercury	11-215-00065	0.187	1.70	1.73	1.70	1.82	89	94	6
Mercury	11-215-00070	0.692	1.24	1.24	1.92	1.92	99	99	0
Nickel	11-215-00065	U	37.6	25.5	32.1	20.3	85	80	7
Nickel	11-215-00070	U	24.1	24.8	20.1	21.1	83	85	2
Selenium	11-215-00065	1.38	9.40	6.37	8.04	5.86	71	70	1
Selenium	11-215-00070	1.12	6.03	6.20	5.19	5.31	67	68	0
Silver	11-215-00065	0.59	37.6	25.5	32.2	21.4	84	82	3
Silver	11-215-00070	U	24.1	24.8	20.7	20.4	86	82	4
Thallium	11-215-00065	0.191	9.40	6.37	8.08	5.04	84	76	10
Thallium	11-215-00070	0.14	6.03	6.20	4.15	4.27	66	67	0
Vanadium	11-215-00065	0.44	37.6	25.5	33.5	22.3	88	86	2
Vanadium	11-215-00070	0.0042	24.1	24.8	21.8	21.5	90	87	4
Zinc	11-215-00065	304	37.6	25.5	382	350	NC	NC	NC
Zinc	11-215-00070	49.8	24.1	24.8	69.9	76.2	83	106	24

Table 2.25 (Cont) Results of the MS/MSD Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
(based on dry weight)

Metal	Client #	Sample Conc. mg/kg	Original Conc. Spike mg/kg	Original Conc. Dup. mg/kg	Recovered Conc. Spike mg/kg	Recovered Conc. Dup. mg/kg	% Recovery Spike	% Recovery Dup.	RPD
Antimony	11-215-00206	0.109	7.59	7.73	6.43	6.56	83	83	0
Antimony	11-215-00217	0.238	8.22	7.94	5.79	5.37	68	65	4
Arsenic	11-215-00206	0.382	7.59	7.73	5.65	5.91	69	72	3
Arsenic	11-215-00217	1.07	8.22	7.94	6.35	5.02	64	50	25
Barium	11-215-00206	38.1	30.3	30.9	64.8	66.4	88	92	4
Barium	11-215-00217	38.4	32.9	31.8	66.7	67.4	86	91	6
Beryllium	11-215-00206	0.024	30.3	30.9	26.8	27.5	88	89	1
Beryllium	11-215-00217	0.11	32.9	31.8	29.2	28.5	88	89	1
Cadmium	11-215-00206	0.28	30.3	30.9	24.6	24.8	80	79	1
Cadmium	11-215-00217	0.3	32.9	31.8	26.0	25.6	78	80	2
Chromium	11-215-00206	3.07	30.3	30.9	27.3	28.1	80	81	1
Chromium	11-215-00217	3.12	32.9	31.8	30.3	29.2	83	82	1
Cobalt	11-215-00206	0.52	30.3	30.9	26.0	27.2	84	86	3
Cobalt	11-215-00217	0.81	32.9	31.8	28.5	27.1	84	83	2
Copper	11-215-00206	8.4	30.3	30.9	35.4	36.2	89	90	1
Copper	11-215-00217	11.1	32.9	31.8	41.4	38.7	92	87	6
Lead	11-215-00206	0.3	7.59	7.73	6.59	7.21	83	89	8
Lead	11-215-00217	0.267	8.22	7.94	6.58	6.41	77	77	1
Manganese	11-215-00206	4.53	30.3	30.9	30.9	31.8	87	88	1
Manganese	11-215-00217	7.71	32.9	31.8	35.1	33.7	83	82	2
Mercury	11-215-00206	U	1.39	1.56	1.26	1.41	90	90	0
Mercury	11-215-00217	0.074	1.50	1.42	1.43	1.35	90	90	0
Nickel	11-215-00206	1.48	30.3	30.9	25.9	26.2	80	80	1
Nickel	11-215-00217	1.62	32.9	31.8	28.1	28	81	83	3
Selenium	11-215-00206	4.85	7.59	7.73	8.81	10.0	52	67	24
Selenium	11-215-00217	3.35	8.22	7.94	7.90	8.09	55	60	8
Silver	11-215-00206	U	30.3	30.9	25.2	25.8	83	83	0
Silver	11-215-00217	U	32.9	31.8	27.7	26.5	84	83	1
Thallium	11-215-00206	0.022	7.59	7.73	6.04	6.97	79	90	12
Thallium	11-215-00217	0.116	8.22	7.94	7.27	6.98	87	86	1
Vanadium	11-215-00206	0.41	30.3	30.9	26.5	28.2	86	90	4
Vanadium	11-215-00217	2.2	32.9	31.8	31.3	29.4	88	86	3
Zinc	11-215-00206	95.2	30.3	30.9	120	122	82	87	6
Zinc	11-215-00217	120	32.9	31.8	145	147	76	85	11

Table 2.25 (Cont) Results of the MS/MSD Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
(based on dry weight)

Metal	Client #	Sample Conc. mg/kg	Original Conc. Spike mg/kg	Original Conc. Dup. mg/kg	Recovered Conc. Spike mg/kg	Recovered Conc. Dup. mg/kg	% Recovery Spike	% Recovery Dup.	RPD
Antimony	11-215-00234	U	8.94	7.43	9.46	8.12	106	109	3
Antimony	11-215-00100	U	7.90	8.20	8.22	9.06	104	111	6
Antimony	11-215-00112	U	9.35	9.75	9.8	9.86	105	101	4
Arsenic	11-215-00234	0.04	8.94	7.43	7.5	5.99	83	80	4
Arsenic	11-215-00100	U	7.90	8.20	4.84	6.33	61	77	23
Arsenic	11-215-00112	0.051	9.35	9.75	6.51	6.77	69	69	0
Barium	11-215-00234	28.8	35.8	29.7	57.6	57.4	81	96	18
Barium	11-215-00100	3.23	31.6	32.8	34.2	32.5	98	89	9
Barium	11-215-00112	2.77	37.4	39.0	36.5	38.1	90	91	0
Beryllium	11-215-00234	0.046	35.8	29.7	31.9	27.1	89	91	2
Beryllium	11-215-00100	0.042	31.6	32.8	28.6	30.1	90	92	1
Beryllium	11-215-00112	U	37.4	39.0	33.0	35.4	88	91	3
Cadmium	11-215-00234	U	35.8	29.7	28.7	24.2	80	81	1
Cadmium	11-215-00100	U	31.6	32.8	25.6	26.6	81	81	0
Cadmium	11-215-00112	U	37.4	39.0	29.1	32.2	78	83	6
Chromium	11-215-00234	2.06	35.8	29.7	31.6	26.8	83	83	1
Chromium	11-215-00100	1.31	31.6	32.8	28.2	29.2	85	85	0
Chromium	11-215-00112	1.39	37.4	39.0	32.3	34.5	83	85	3
Cobalt	11-215-00234	0.855	35.8	29.7	30.7	25.9	83	84	1
Cobalt	11-215-00100	0.252	31.6	32.8	27.2	28.9	85	87	2
Cobalt	11-215-00112	U	37.4	39.0	31.2	33.6	83	86	3
Copper	11-215-00234	19.9	35.8	29.7	49.6	49.1	83	98	17
Copper	11-215-00100	3.13	31.6	32.8	31.5	32.8	90	90	1
Copper	11-215-00112	2.79	37.4	39.0	36.2	37.8	89	90	1
Lead	11-215-00234	U	8.94	7.43	7.83	7.97	88	107	20
Lead	11-215-00100	U	7.90	8.20	6.23	6.56	79	80	2
Lead	11-215-00112	0.429	9.35	9.75	6.77	8.31	68	81	18

Table 2.25 (Cont) Results of the MS/MSD Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
(based on dry weight)

Metal	Client #	Sample Conc. mg/kg	Original Conc. Spike mg/kg	Original Conc. Dup. mg/kg	Recovered Conc. Spike mg/kg	Recovered Conc. Dup. mg/kg	% Recovery Spike	% Recovery Dup.	RPD
Manganese	11-215-00234	21.5	35.8	29.7	49.9	50.2	79	97	20
Manganese	11-215-00100	11.4	31.6	32.8	45.5	38.3	108	82	27
Manganese	11-215-00112	21.8	37.4	39.0	54.0	56.2	86	88	2
Mercury	11-215-00234	0.083	1.46	1.92	1.31	1.82	84	91	7
Mercury	11-215-00100	.1	1.22	1.29	2.2	2.32	98	103	4
Mercury	11-215-00112	0.815	1.11	1.24	1.78	1.93	87	90	3
Nickel	11-215-00234	0.599	35.8	29.7	30.6	25.1	84	82	2
Nickel	11-215-00100	U	31.6	32.8	26.3	27.3	83	83	0
Nickel	11-215-00112	U	37.4	39.0	30.7	33.8	82	87	5
Selenium	11-215-00234	0.397	8.94	7.43	6.77	5.64	71	71	1
Selenium	11-215-00100	0.819	7.90	8.20	6.25	7.3	69	79	14
Selenium	11-215-00112	1.43	9.35	9.75	7.92	8.36	69	71	2
Silver	11-215-00234	U	35.8	29.7	29.4	25.4	82	85	4
Silver	11-215-00100	0.306	31.6	32.8	26.8	28	84	84	1
Silver	11-215-00112	U	37.4	39.0	30.9	33	83	85	2
Thallium	11-215-00234	0.211	8.94	7.43	9.19	7.67	100	100	0
Thallium	11-215-00100	0.161	7.90	8.20	8.22	8.36	102	100	2
Thallium	11-215-00112	0.234	9.35	9.75	9.8	10.2	102	102	0
Vanadium	11-215-00234	0.44	35.8	29.7	31.9	27.4	88	91	3
Vanadium	11-215-00100	0.637	31.6	32.8	28.3	29.8	87	89	2
Vanadium	11-215-00112	0.07	37.4	39.0	33.3	35.5	89	91	2
Zinc	11-215-00234	85.6	35.8	29.7	114	112	79	89	11
Zinc	11-215-00100	61.3	31.6	32.8	95.1	88.6	107	83	25
Zinc	11-215-00112	66.9	37.4	39.0	95.4	109	76	108	34

Table 2.25 (Cont) Results of the MS/MSD Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
(based on dry weight)

Metal	Client #	Sample Conc. mg/kg	Original Conc. Spike mg/kg	Original Conc. Dup. mg/kg	Recovered Conc. Spike mg/kg	Recovered Conc. Dup. mg/kg	% Recovery Spike	% Recovery Dup.	RPD
Antimony	11-215-00066	0.46	8.17	8.29	8.58	9.14	99	105	5
Antimony	11-215-00231	0.252	6.52	6.23	7	6.62	103	102	1
Antimony	11-215-00136	0.317	7.76	7.45	7.64	7.48	94	96	2
Antimony	11-215-00237	0.263	6.00	6.08	5.91	6.06	94	95	1
Arsenic	11-215-00066	0.629	8.17	8.29	7.09	7.17	79	79	0
Arsenic	11-215-00231	0.206	6.52	6.23	5.04	4.69	74	72	3
Arsenic	11-215-00136	2.84	7.76	7.45	8.81	8.83	77	80	4
Arsenic	11-215-00237	0.213	6.00	6.08	3.79	3.72	60	58	3
Barium	11-215-00066	18.2	32.7	33.2	43.1	45.4	76	82	7
Barium	11-215-00231	6.01	26.1	24.9	29.4	30.1	90	97	8
Barium	11-215-00136	5.16	31.0	29.8	35.2	32.8	97	93	4
Barium	11-215-00237	4.59	24.0	24.3	27.2	28.2	94	97	3
Beryllium	11-215-00066	0.016	32.7	33.2	28.4	30.4	87	92	5
Beryllium	11-215-00231	U	26.1	24.9	23.9	24.2	92	97	6
Beryllium	11-215-00136	U	31.0	29.8	29.7	27.6	96	93	3
Beryllium	11-215-00237	U	24.0	24.3	22.2	22.3	93	92	1
Cadmium	11-215-00066	0.264	32.7	33.2	25.9	27.9	78	83	6
Cadmium	11-215-00231	0.215	26.1	24.9	21.8	21.9	83	87	5
Cadmium	11-215-00136	0.521	31.0	29.8	27.4	25.1	87	82	5
Cadmium	11-215-00237	0.402	24.0	24.3	20	20.1	82	81	1
Chromium	11-215-00066	2.55	32.7	33.2	30	31.2	84	86	3
Chromium	11-215-00231	2.44	26.1	24.9	23.9	24.5	82	89	7
Chromium	11-215-00136	1.06	31.0	29.8	30.5	27	95	87	9
Chromium	11-215-00237	1.56	24.0	24.3	22.8	23.1	89	89	0
Cobalt	11-215-00066	0.287	32.7	33.2	27.3	29	83	87	5
Cobalt	11-215-00231	0.414	26.1	24.9	22.9	22.5	86	89	3
Cobalt	11-215-00136	0.627	31.0	29.8	29.4	27.1	93	89	4
Cobalt	11-215-00237	0.532	24.0	24.3	20.9	20.3	85	81	4
Copper	11-215-00066	2.03	32.7	33.2	31.5	33.9	90	96	6
Copper	11-215-00231	6.32	26.1	24.9	31.2	31.6	95	101	6
Copper	11-215-00136	26.9	31.0	29.8	56.4	52.5	95	86	10
Copper	11-215-00237	10.9	24.0	24.3	33.2	32.8	93	90	3
Lead	11-215-00066	0.037	8.17	8.29	6.99	7.33	85	88	3
Lead	11-215-00231	0.051	6.52	6.23	4.54	5.18	69	82	18
Lead	11-215-00136	0.733	7.76	7.45	7.1	7.01	82	84	3
Lead	11-215-00237	0.142	6.00	6.08	4.58	4.86	74	78	5

Table 2.25 (Cont) Results of the MS/MSD Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers
(based on dry weight)

Metal	Client #	Sample Conc. mg/kg	Original Conc. Spike mg/kg	Original Conc. Dup. mg/kg	Recovered Conc. Spike mg/kg	Recovered Conc. Dup. mg/kg	% Recovery Spike	% Recovery Dup.	RPD
Manganese	11-215-00066	11.1	32.7	33.2	34.8	37.2	73	79	8
Manganese	11-215-00231	6.48	26.1	24.9	28.7	29.1	85	91	6
Manganese	11-215-00136	15.6	31.0	29.8	42.2	41.6	86	87	2
Manganese	11-215-00237	12.5	24.0	24.3	31.7	30.9	80	76	6
Mercury	11-215-00066	U	1.65	1.68	1.56	1.59	95	95	0
Mercury	11-215-00231	U	1.00	0.825	0.897	0.742	90	90	0
Mercury	11-215-00136	0.584	1.67	1.39	2.09	1.81	90	88	2
Mercury	11-215-00237	0.049	0.947	1.03	0.852	0.924	85	85	1
Nickel	11-215-00066	U	32.7	33.2	28.3	29.2	87	88	2
Nickel	11-215-00231	1.01	26.1	24.9	22.4	22.8	82	87	6
Nickel	11-215-00136	0.733	31.0	29.8	29.6	26.8	93	87	6
Nickel	11-215-00237	0.474	24.0	24.3	20.4	20.3	83	82	2
Selenium	11-215-00066	1.04	8.17	8.29	7.27	7.92	76	83	8
Selenium	11-215-00231	0.08	6.52	6.23	4.21	4.71	63	74	16
Selenium	11-215-00136	2.16	7.76	7.45	9.28	7.4	92	70	27
Selenium	11-215-00237	0.61	6.00	6.08	3.61	4.42	50	63	22
Silver	11-215-00066	0.306	32.7	33.2	27.4	29.8	83	89	7
Silver	11-215-00231	0.342	26.1	24.9	22.9	22.9	86	91	5
Silver	11-215-00136	0.217	31.0	29.8	28.5	25.9	91	86	6
Silver	11-215-00237	0.219	24.0	24.3	21.2	20.2	87	82	6
Thallium	11-215-00066	0.284	8.17	8.29	7.09	7.51	83	87	5
Thallium	11-215-00231	0.048	6.52	6.23	5.63	5.33	86	85	1
Thallium	11-215-00136	0.092	7.76	7.45	8.04	7.71	102	102	0
Thallium	11-215-00237	0.054	6.00	6.08	5.29	5.49	87	89	2
Vanadium	11-215-00066	0.262	32.7	33.2	28.6	30.8	87	92	6
Vanadium	11-215-00231	U	26.1	24.9	23.9	23.9	92	96	5
Vanadium	11-215-00136	U	31.0	29.8	30	27.4	97	92	5
Vanadium	11-215-00237	U	24.0	24.3	22.5	22.1	94	91	3
Zinc	11-215-00066	362	32.7	33.2	377	359	NC	NC	NC
Zinc	11-215-00231	84.9	26.1	24.9	99.6	106	56	85	40
Zinc	11-215-00136	106	31.0	29.8	137	126	100	67	39
Zinc	11-215-00237	110	24.0	24.3	129	131	79	86	9

Table 2.28 Results of the Blank Spike Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers

Metal	Spiked Conc mg/kg	Recovered Conc mg/kg	% Rec
Aluminum	400	358	90
Antimony	2.50	2.83	113
Arsenic	2.50	2.49	100
Barium	10.0	9.22	92
Beryllium	10.0	8.9	89
Cadmium	10.0	8.16	82
Calcium	400	345	86
Chromium	10.0	8.78	88
Cobalt	10.0	8.7	87
Copper	10.0	9.18	92
Iron	400	360	90
Lead	2.50	2.38	95
Magnesium	400	351	88
Manganese	10.0	8.71	87
Mercury	0.400	0.400	100
Nickel	10.0	8.61	86
Potassium	400	323	81
Selenium	2.50	2.59	104
Silver	10.0	8.6	86
Sodium	400	358	90
Thallium	2.50	2.71	108
Vanadium	10.0	9.1	91
Zinc	10.0	9.41	94

Table 2.26 (Cont) Results of the Blank Spike Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers

Metal	Spiked Conc mg/kg	Recovered Conc mg/kg	% Rec
Aluminum	400	351	88
Antimony	2.50	2.45	98
Arsenic	2.50	2.65	106
Barium	10.0	9.03	90
Beryllium	10.0	8.76	88
Cadmium	10.0	8.16	82
Calcium	400	336	84
Chromium	10.0	8.87	89
Cobalt	10.0	8.49	85
Copper	10.0	9.09	91
Iron	400	355	89
Lead	2.50	2.83	113
Magnesium	400	341	85
Manganese	10.0	8.49	85
Mercury	0.400	0.380	95
Nickel	10.0	8.41	84
Potassium	400	391	98
Selenium	2.50	2.76	110
Silver	10.0	8.44	84
Sodium	400	349	87
Thallium	2.50	2.43	97
Vanadium	10.0	9.11	91
Zinc	10.0	8.61	86

Table 2.26 (Cont) Results of the Blank Spike Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers

Metal	Spiked Conc mg/kg	Recovered Conc mg/kg	% Rec
Aluminum	400	350	88
Antimony	2.50	2.74	110
Antimony	2.50	2.7	108
Arsenic	2.50	2.63	105
Barium	10.0	8.97	90
Beryllium	10.0	8.94	89
Cadmium	10.0	8.23	82
Calcium	400	340	85
Chromium	10.0	8.92	89
Cobalt	10.0	8.79	88
Copper	10.0	9.18	92
Iron	400	354	89
Lead	2.50	2.45	98
Magnesium	400	342	86
Manganese	10.0	8.77	88
Mercury	0.400	0.400	100
Nickel	10.0	8.58	86
Potassium	400	350	88
Selenium	2.50	2.60	104
Silver	10.0	8.5	85
Sodium	400	343	86
Thallium	2.50	2.59	104
Vanadium	10.0	9.01	90
Zinc	10.0	8.97	90

Table 2.26 (Cont) Results of the Blank Spike Analysis for TAL Metals in Tissue
WA # 2-215 Avtex Fibers

Metal	Spiked Conc mg/kg	Recovered Conc mg/kg	% Rec
Aluminum	400	350	88
Antimony	2.50	2.73	109
Arsenic	2.50	2.62	105
Barium	10.0	9.06	91
Beryllium	10.0	8.87	89
Cadmium	10.0	8.28	83
Calcium	400	339	85
Chromium	10.0	8.82	88
Cobalt	10.0	8.57	86
Copper	10.0	9.32	93
Iron	400	355	89
Lead	2.50	2.51	100
Magnesium	400	345	86
Manganese	10.0	8.71	87
Mercury	0.400	0.380	95
Nickel	10.0	8.65	87
Potassium	400	336	84
Selenium	2.50	2.48	99
Silver	10.0	8.6	88
Sodium	400	349	87
Thallium	2.50	2.60	104
Vanadium	10.0	8.83	88
Zinc	10.0	8.91	89

Table 2.27 Results of the QC Standard Analysis for Metals (Soil)
WA # 2-215 Avtex Fibers

Metal	Date Analyzed	Quality Control Standard	Conc. Rec µg/L	True Value µg/L	95 % Confidence Interval	% Rec
Arsenic	06/11/97	QC-21 x100	1033	1000	NA	103
Cadmium	06/11/97	QC-21 x100	1047	1000	NA	105
	06/11/97	ERA-431	85.6	82	67 - 97	104
Chromium	06/11/97	QC-21 x100	1076	1000	NA	108
	06/11/97	ERA-431	569	529	434 - 624	108
Copper	06/11/97	QC-21 x100	1035	1000	NA	104
	06/11/97	ERA-431	217	208	171 - 245	104
Iron	06/11/97	QC-21 x100	1089	1000	NA	109
	06/11/97	ERA-431	741	676	554 - 798	110
Lead	06/11/97	QC-21 x100	1067	1000	NA	107
	06/11/97	ERA-431	378	353	289 - 417	107
Zinc	06/11/97	QC-21 x100	1044	1000	NA	104
	06/11/97	ERA-431	447	424	348 - 500	105

Table 2.28 Results of the MS/MSD Analysis for Metals in Soil
WA # 2-215 Avtex Fibers
Based on Dry Weight

Metal	Client #	Sample Conc. mg/kg	Original Conc. Spike mg/kg	Original Conc. Dup. mg/kg	Recovered Conc. Spike mg/kg	Recovered Conc. Dup. mg/kg	% Recovery Spike	% Recovery Dup.	RPD
Arsenic	I4	5.07	49.0	45.5	45.9	40.3	83	78	7
Arsenic	XRF34	49.6	49.0	45.0	103	92.8	109	96	13
Cadmium	I4	0.036	49.0	45.5	44.9	42.3	92	93	2
Cadmium	XRF34	0.244	49.0	45.0	47.2	44	96	97	1
Chromium	I4	21.7	49.0	45.5	70.4	68	99	102	2
Chromium	XRF34	12.2	49.0	45.0	61.8	58.8	101	103	2
Copper	I4	9.73	49.0	45.5	56.1	54.1	95	98	3
Copper	XRF34	27.9	49.0	45.0	77.4	74.4	101	103	2
Lead	I4	28.2	49.0	45.5	82.2	73.4	110	99	10
Lead	XRF34	11	49.0	45.0	56.9	55.2	94	98	5
Zinc	I4	92	49.0	45.5	149	146	116	119	2
Zinc	XRF34	21.7	49.0	45.0	71.2	67.7	101	102	1

Table 2.29 Results of the Blank Spike Analysis for Metals in Soil
WA # 2-215 Avtex Fibers

Metal	Spiked Conc mg/kg	Sand Blk Conc mg/kg	Rec Conc. mg/kg	% Rec
Arsenic	49.0	U	47.4	97
Cadmium	49.0	U	45.8	93
Chromium	49.0	U	48.7	99
Copper	49.0	U	47.5	97
Iron	784	U	783	100
Lead	49.0	U	47.2	96
Zinc	49.0	U	49.9	102

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Roy F. Weston, Inc.
GSA Raritan Depot
Building 209 Annex (Bay F)
2890 Woodbridge Avenue
Edison, New Jersey 08837-3679
908-321-4200 • Fax 908-494-4021

Southwest Labs of Oklahoma
1700 W. Albany Suite A
Broken Arrow, OK 74012

Attn: Dave LeMaster

15 May 1997

Project # 3347-041-001-1215 Avtex Fibers

As per Weston REAC Purchase Order number 80025, please analyze samples according to the following parameters:

Analysis/Method	Matrix	# of samples
VOC/SW-846-8260/ See attached list	Sediment Water	19 14
Data package: see attached Deliverables Requirements		

Samples are expected to arrive at your laboratory on May 16, 1997. **All applicable QA/QC (MS/MSD) analysis as per method, will be performed on our sample matrix.** Preliminary sample and MS/MSD result tables plus a signed copy of our Chain of Custody must be faxed to REAC 10 business days after receipt of each batch of samples. The complete data package is due 21 business days after receipt of last batch of samples. The complete data package must include all items in the attached checklist.

Please submit all reports and technical questions concerning this project to **John Johnson at (908) 321-4248 or fax to (908) 494-4020.** Any contractual question, please call Cynthia Davison at (908) 321-4296.
Thank you

Sincerely,

Misty Barkley

Misty Barkley
Data Validation and Report Writing Group Leader
Roy F. Weston, Inc. / REAC Project

MB:jj Attachments

cc:	R. Singhvi	V. Kansal	C. Davison
	M. Sprenger	Subcontracting File	M. Huston
	1215\non\mem\9705\sub\1215Con3	B. Lewan	M. Barkley

00160

REAC, [illegible]son, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHA OF CUSTODY RECORD

Project Name: Autex Fibers
Project Number: 03347-142-001-2215-01
RFW Contact: Mark Huston Phone: 321-4285

No: 03913

SHEET NO. 1 OF 1

060397

Sample Identification / **Analyses Requested**

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	metals*			
869	XRF5	RIVER	S	11-MAY-97	1	XRF cup/none				
870	XRF34	UPLAND		12-MAY-97						
871	XRF25	FLY ASH								
872	XRF37	UPLAND								
873	XRF38									
874	XRF32									
875	XRF31									
876	XRF30									
877	XRF21			11-MAY-97						

Matrix:

SD - Sediment
DS - Drum Solids
DL - Drum Liquids
X - Other
PW - Potable Water
GW - Groundwater
SW - Surface Water
SL - Sludge
S - Soil
W - Water
O - Oil
A - Air

Special Instructions:

* Zn, Pb, Cu, Cr, As, Cd, Fe

FOR SUBCONTRACTING USE ONLY

FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
9/analysis	Dennis Kalinsky	6/3/97	B Lewis	6/3/97	1100	All/Analysis	B Lewis	6/3/97	Colleen Eg	6/3/97	11:25

AR300756

00161

REAC, [illegible]son, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHA[illegible] OF CUSTODY RECORD

Project Name: Autex Fibers
Project Number: 03347-142-001-2215-01
RFW Contact: Mark Hestan Phone: 321-4285

No: 03914

SHEET NO.__OF__

060397

00162

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	metals*			
f60	B1	B1	S	14-may-97	1	XRF cup/none	✓			
f61	I4	I4	↓	↓	↓	↓	↓			
f62	H5	H5								
f63	I5	I5								
f64	A2	A2								
f65	A3	A3								
f66	A4	A4								
f67	AØ	AØ								
f68	BØ	BØ	↓	↓	↓	↓	↓			
				DW					DW	

Sample Identification — Analyses Requested

Matrix:

SD -	Sediment	PW -	Potable Water	S -	Soil		
DS -	Drum Solids	GW -	Groundwater	W -	Water		
DL -	Drum Liquids	SW -	Surface Water	O -	Oil		
X -	Other	SL -	Sludge	A -	Air		

Special Instructions:
* Zn, Pb, Cu, Cr, As, Cd, Fe

FOR SUBCONTRACTING USE ONLY

FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
9/analyses	Dennis Kalinsky	6/3/97	B Lewan	6/3/97	1100	All/Analyses	B Lewan	6/3/97	Colleen Egan	6/3/97	11:30

REAC, . son, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHA OF CUSTODY RECORD

Project Name: AVTEX FIBER
Project Number: 03347-041-001-1215-01
RFW Contact: ______ Phone: ______

No: 00617

SHEET NO. 1 OF 1

051597

Sample Identification | **Analyses Requested**

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	TAL Metals			
156	BLANK	051497	—	5/14/97	2	32oz WM / 0°C	X			

Matrix:

SD - Sediment	DS - Drum Solids	DL - Drum Liquids	X - Other		
PW - Potable Water	GW - Groundwater	SW - Surface Water	SL - Sludge		
S - Soil	W - Water	O - Oil	A - Air		

Special Instructions:

— 500g CO_2 blanks

FOR SUBCONTRACTING USE ONLY

FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
All / Analysis	[signature]	5/15/97	[signature]	5/15/97							
			[signature]	5/15/97	4:3						

AR300758

REAC, son, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHA OF CUSTODY RECORD

Project Name: Autex Fiber
Project Number: 03347-041-001-1215-01
RFW Contact: Mark Huston Phone: (908) 321-4200

No: 09798

SHEET NO. 1 OF 1

052197

Sample Identification

Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	TAL Metals	Pest/PCB		
392	11-215-00130	Reference	Whole Body	5/15/97	1	4oz glass/4°C				
393	00131	Reference			1					
394	00132	BM1-1			1					
395	00133	BM1-1			1					
396	00134	BM1-2			1					
397	00135	BM1-2			1					
398	00136	BM1-3			1					
399	00137	BM1-3			1					
400	00138	BM1-4			1					
401	00139	BM1-5			1					
402	00140	BM1-5			1					
403	00237	TP-4A-8 (22.5)		5/16/97	1	Foil/4°C				
404	00238	TP-7-5 (34.86)		5/16/97	1	Foil/4°C				

84

00164

Matrix:
SD - Sediment PW - Potable Water S - Soil
DS - Drum Solids GW - Groundwater W - Water
DL - Drum Liquids SW - Surface Water O - Oil
X - Other SL - Sludge A - Air

Special Instructions:
% lipids & % moisture
* Clams only

FOR SUBCONTRACTING USE ONLY

FROM CHAIN OF 1215-037
CUSTODY # *1-215-019

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
All analysis	Mark Huston	5/19/97	[illegible]	5/19/97	11:00	All Metals	B. Lamb	5/21/97	[illegible]	5/21/97	9:25am
All/Analysis	[illegible]	5/21/97	B. Lamb	5/21/97	0845						

FORM #4

AR300739

USEPA ER[illegible] | **CHAIN OF CUSTODY RECORD** | **COC # 1-215-002**

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022
051497

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 2
Cooler #:2342
Lab: REAC
Contact: Mark Huston
(908) 321-4285

00165

[redacted]

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
920	B	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
↓	C	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	8 oz glass/wet ice, 4C	metals, TAL		
	J	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	32 oz glass/wet ice, 4C	Grain Size		
921	B	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	C	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	8 oz glass/wet ice, 4C	metals, TAL		
↓	J	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	32 oz glass/wet ice, 4C	Grain Size		
922	A	11-215-00046	Sulfate Basin No. 5	Water	5/12/97	1 L poly/4C	metals, TAL		
↓	B	11-215-00046	Sulfate Basin No. 5	Water	5/12/97	1 L Amber/4C	Pesticides/PCB		
923	A	11-215-00047	Fly Ash Basin No. 4	Water	5/12/97	1 L poly/4C	metals, TAL		
↓	B	11-215-00047	Fly Ash Basin No. 4	Water	5/12/97	1 L Amber/4C	Pesticides/PCB		
924	A	11-215-00060	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
925	A	11-215-00061	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
926	A	11-215-00062	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
927	A	11-215-00063	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
928	A	11-215-00064	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
929	A	11-215-00065	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST	Y	
930	A	11-215-00070	Outfall 001	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST	Y	
931	A	11-215-00071	Outfall 001	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
932	A	11-215-00072	Outfall 001	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
933	A	11-215-00073	Outfall 001	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		

Special Instructions: Peer review (PR) MS/MSD on 215-065, 215-070

Note: * Fish Tissue

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time
1-20 / Analysis	Mark Huston	5/13/97	B Lewan	5/14/97	1030
All Anal[illegible]	[illegible]	5/15/97	~~B Lewan~~	~~5/15/97~~	
41 M[illegible]ls	B Lewan	5/15/97	Colleen Egan	5/15/97	4:3[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Items/Reason	Relinquished By	Date	Received By	Date	Time
All / Analysis	B Lewan	5/14/97	[illegible]	5/14/97	10:40
41 Pest PCB	B Lewan	5/14/97	[illegible]	5/14/97	2:00 pm
[illegible]1 Metals	B Lewan	5/14/97	Colleen Egan	[illegible]	2:00 PM

AR300730

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-003

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022
051597

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 2 of 2
Cooler #:2342
Lab: REAC
Contact: Mark Huston
(908) 321-4285

00166

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
157	A	11-215-00074	Outfall 001	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
158	A	11-215-00075	Outfall 001	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
159	A	11-215-00076	Outfall 001	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
160	A	11-215-00077	Outfall 001	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
161	A	11-215-00080	Reference	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
162	A	11-215-00081	Reference	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
163	A	11-215-00082	Reference	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
164	A	11-215-00083	Reference	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
165	A	11-215-00084	Reference	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
166	A	11-215-00085	Reference	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
167	A	11-215-00086	Reference	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
168	A	11-215-00087	Reference	WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		

[redacted]

Special Instructions: Peer review [illegible] Note: * Fish Tissue

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
1-12 / Analysis	Mark Huston	5/13/97	B Levan	5/14/97	1030	All / Analysis	B Levan	5/14/97	[illegible]	5/14/97	10:40
All Analyses	[illegible]	5/15/97	C Allen [illegible]	5/15/97	4:30						

AR300761

USEPA ER. — CHAIN OF CUSTODY RECORD — COC # 1-215-006

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022
051597

Project Name: Aviex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:009014
Lab: REAC Biology Lab
Contact: Mark Huston
(908) 321-4285

00167

[redacted]

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	*	MS MSD	Comments
078	A	11-215-00201	TP-6-9	WHOLE BODY	5/13/97	Foil/4C	TAL/PCB/PEST			
079	A	11-215-00202	Ref.-5-19	WHOLE BODY	5/13/97	Foil/4C	TAL/PCB/PEST			
080	A	11-215-00203	Ref.-2-11	WHOLE BODY	5/13/97	Foil/4C	TAL/PCB/PEST			
081	A	11-215-00204	WA-?-?	WHOLE BODY	5/13/97	Foil/4C	TAL/PCB/PEST			
082	A	11-215-00205	TP-3-19	WHOLE BODY	5/13/97	Foil/4C	TAL/PCB/PEST			
083	A	11-215-00206	FA-10-8	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
084	A	11-215-00207	FA-10-10	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
085	A	11-215-00208	WA-A-50	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
086	A	11-215-00209	REF-6-1	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
087	A	11-215-00210	REF-6-7	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
088	A	11-215-00211	REF-5-18	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
089	A	11-215-00212	REF-2-10	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
090	A	11-215-00213	REF-5-10	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
091	A	11-215-00214	REF-1-17	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
092	A	11-215-00215	REF-4-17	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
093	A	11-215-00216	REF-5-9	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
094	A	11-215-00217	FA-10-8	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			
095	A	11-215-00218	FA-10-9	WHOLE BODY	5/14/97	Foil/4C	TAL/PCB/PEST			

Special Instructions: * percent lipids / percent moisture

Peer review BO

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
1-18 / Analysis	Mark Huston	5/14/97	B Lewis	5/15/97	1000	All / Homogenization	B Lewis	5/15/97	[illegible]	5/15/97	11:00
			Colleen Egan	5/16/97	4:00				[illegible]	5/16/97	16:15

AR300762

00168

[redacted]

USEPA ER

CHAIN OF CUSTODY RECORD

COC # 1-215-007

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022
051697

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 2
Cooler #:009014
Lab: REAC Biology Lab
Contact: Mark Huston
(908) 321-4285

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
239	A	11-215-00090	Outfall 002	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
240	A	11-215-00091	Outfall 002	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
241	A	11-215-00092	Outfall 002	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
242	A	11-215-00093	Outfall 002	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
243	A	11-215-00094	Outfall 002	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
244	A	11-215-00095	Outfall 002	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
245	A	11-215-00096	Outfall 002	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
246	A	11-215-00097	Outfall 002	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
247	A	11-215-00100	Outfall 004	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST	Y	
248	A	11-215-00101	Outfall 004	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
249	A	11-215-00102	Outfall 004	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
250	A	11-215-00103	Outfall 004	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
251	A	11-215-00104	Outfall 004	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
252	A	11-215-00105	Outfall 004	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
253	A	11-215-00106	Outfall 004	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
254	A	11-215-00107	Outfall 004	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
255	A	11-215-00110	Downstream	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
256	A	11-215-00111	Downstream	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
257	A	11-215-00112	Downstream	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
258	A	11-215-00113	Downstream	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		

Special Instructions:

Peer review

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
1-20/Analysis	Mark Huston	5/14/97	B Lewa	5/16/97	0930	All/Homogenization	B Lewa	5/16/97	[illegible]	5/16/97	1310
All/Analysis	[illegible]	5/19/97	B Lewa	5/19/97	1555	All/Metals	B Lewa	5/19/97	[illegible]	5/19/97	4:00pm

AR300763

USEPA ER… | CHAIN OF CUSTODY RECORD | COC # 1-215-008

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022
051697

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 2 of 2
Cooler #:002364
Lab: REAC Laboratory
Contact: Mark Huston
(908) 321-4285

00169

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
275	A	11-215-00114 ✓	Downstream	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
276	A	11-215-00115 ✓	Downstream	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
277	A	11-215-00116 ✓	Downstream	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
278	A	11-215-00117 ✓	Downstream	WHOLE BODY	5/14/97	Foil/4 C	TAL/PCB/PEST		
279	A	11-215-00414 ✓	Outfall 004	Water	5/14/97	1 L poly/HNO3 pH<2	metals, TAL	Y	
↓	B	11-215-00414 ✓	Outfall 004	Water	5/14/97	1 L Amber/4C	Pesticides/PCB	Y	
280	A	11-215-00415	Outfall 005	Water	5/14/97	1 L poly/HNO3 pH<2	metals, TAL		
↓	B	11-215-00415 ✓	Outfall 005	Water	5/14/97	1 L Amber/4C	Pesticides/PCB		

[redacted]

Special Instructions: Peer review (PK)

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
1-8/Analysis	Mark Huston	5/14/97	B Lewan	5/16/97	0930	All/Homogenization	B Lewan	5/16/97	[illegible]	5/16/97	1310
1-4/ Ana…	[illegible]	5/19/97	B Lewan	5/19/97	1555	2/ metals	B Lewan	5/16/97	[illegible]	5/19/97	2:00pm
4/ Metals	B Lewan	5/19/97	[illegible]	5/19/97	4:…	…/Pest/PCB	B Lewan	5/19/97	[illegible]	[illegible]	

AR300…

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-013

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 2
Cooler #:008231
Lab: REAC
Contact: Bettina Lewan
(908) 321-4200

051697

	LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
164	268	A	11-215-00401	Reference	Sediment	5/13/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	269	B	11-215-00401	Reference	Sediment	5/13/97	8 oz glass/wet ice, 4C	metals, TAL		
165	270	A	11-215-00402	BMI-2	Sediment	5/13/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	271	B	11-215-00402	BMI-2	Sediment	5/13/97	8 oz glass/wet ice, 4C	metals, TAL		
166	272	A	11-215-00403	BMI-3	Sediment	5/13/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	273	B	11-215-00403	BMI-3	Sediment	5/13/97	8 oz glass/wet ice, 4C	metals, TAL		
167	274	A	11-215-00404	BMI-4	Sediment	5/13/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	275	B	11-215-00404	BMI-4	Sediment	5/13/97	8 oz glass/wet ice, 4C	metals, TAL		
168	276	A	11-215-00405	BMI-5	Sediment	5/13/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	277	B	11-215-00405	BMI-5	Sediment	5/13/97	8 oz glass/wet ice, 4C	metals, TAL		
169	278	A	11-215-00406	BMI-6	Sediment	5/13/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	279	B	11-215-00406	BMI-6	Sediment	5/13/97	8 oz glass/wet ice, 4C	metals, TAL		
170	280	A	11-215-00407	BMI-1	Sediment	5/13/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	281	B	11-215-00407	BMI-1	Sediment	5/13/97	8 oz glass/wet ice, 4C	metals, TAL		
171	282	B	11-215-00605	Sulfate Basin No. 1	Sediment	5/14/97	8 oz glass/wet ice, 4C	metals, TAL	Y	
172	283	A	11-215-00606	Emergency Pond	Sediment	5/14/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	284	B	11-215-00606	Emergency Pond	Sediment	5/14/97	8 oz glass/wet ice, 4C	metals, TAL		
173	285	A	11-215-00607	Polishing Pond	Sediment	5/14/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	286	B	11-215-00607	Polishing Pond	Sediment	5/14/97	8 oz glass/wet ice, 4C	metals, TAL		
174	287	B	11-215-00608	Viscose Creek	Sediment	5/14/97	8 oz glass/wet ice, 4C	metals, TAL		

Special Instructions: MS/MSD on # 605

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analysed	Mark Huston	5/15/97	B Lewan	5/14/97	0930	All / Analysis metals	B Lewan	5/16/97	[illegible]	5/16/97	3:00 pm
						9 / Pest PCBs	B Lewan	5/16/97	[illegible]	5/16/97	2:40 pm

[redacted]

AR300765

USEPA ERT | **CHAIN OF CUSTODY RECORD** | **COC # 1-215-014**

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 2 of 2
Cooler #:008231
Lab: REAC Laboratory
Contact: Bettina Lewan
(908) 321-4200

051697

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
288	A	11-215-00605	Sulfate Basin No. 1	Sediment	5/14/97	8 oz glass/wet ice, 4C	Pesticides/PCB	Y	
289	A	11-215-00608	Viscose Creek	Sediment	5/14/97	8 oz glass/wet ice, 4C	Pesticides/PCB		

BV

[redacted]

Special Instructions: MS/MSD on 605

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all/analyses	Mark Huston	5/15/97	B Lewan	5/16/97	0936	2/Pest/PCBs	B Lewan	5/16/97	K-[illegible]	5/16/97	2:40pm

AR300766

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-017

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:NA
Lab: REAC Lab
Contact: Bettina Lewan
(908) 321-4200

051697

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD.	Comments
259	A	11-215-00410	Reference	Water	5/14/97	1 L poly/HNO3 pH<2	metals, TAL		
260	B	11-215-00410	Reference	Water	5/14/97	1 L Amber/4C	Pesticides/PCB		
261	A	11-215-00411	BMI-1	Water	5/14/97	1 L poly/HNO3 pH<2	metals, TAL		
262	B	11-215-00411	BMI-1	Water	5/14/97	1 L Amber/4C	Pesticides/PCB		
263	A	11-215-00412	BMI-2	Water	5/14/97	1 L poly/HNO3 pH<2	metals, TAL		
264	B	11-215-00412	BMI-2	Water	5/14/97	1 L Amber/4C	Pesticides/PCB		
265	A	11-215-00413	BMI-3	Water	5/14/97	1 L poly/HNO3 pH<2	metals, TAL		
266	B	11-215-00413	BMI-3	Water	5/14/97	1 L Amber/4C	Pesticides/PCB		
267	A	11-215-00419	Reference No.2	Water	5/15/97	1 L poly/HNO3 pH<2	metals, TAL		

59
160
161
162
163

001772

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/15/97	B Lewan	5/16/97	0930	All 5 metals Analysis	B Lewan	5/16/97	[illegible]	5/16/97	3:00 pm
						B 4 Pest/PCB	B Lewan	5/16/97	[illegible]	5/15/97	2:40 pm

[redacted]

AR300767

USEPA ERT — **CHAIN OF CUSTODY RECORD** — **COC # 1-215-018**

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #: NA
Lab: REAC Laboratory
Contact: Bettina Lewan
(908) 321-4200

051697

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
263280	B ✓	11-215-00419	Reference No.2	Water	5/15/97	1 L Amber/4C	Pesticides/PCB		
281	A	11-215-00601	Sulfate Basin No. 1	Water	5/14/97	1 L poly/HNO3 pH<2	metals, TAL		
281	B ✓	11-215-00601	Sulfate Basin No. 1	Water	5/14/97	1 L Amber/4C	Pesticides/PCB		
2832	A	11-215-00602	Emergency Pond	Water	5/14/97	1 L poly/HNO3 pH<2	metals, TAL		
↓	B ✓	11-215-00602	Emergency Pond	Water	5/14/97	1 L Amber/4C	Pesticides/PCB		
2883	A	11-215-00603	Polish Pond	Water	5/14/97	1 L poly/HNO3 pH<2	metals, TAL		
↓	B ✓	11-215-00603	Polish Pond	Water	5/14/97	1 L Amber/4C	Pesticides/PCB		
2884	A	11-215-00604	Outfall 004	Water	5/14/97	1 L poly/HNO3 pH<2	metals, TAL		
↓	B ✓	11-215-00604	Outfall 004	Water	5/14/97	1 L Amber/4C	Pesticides/PCB		

[redacted]

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analysis	Mark Huston	5/15/97	B Lewan	5/16/97	0930	All 5/Analysis TAL metals	B Lewan	5/16/97	~~Tag~~	5/16/97	3:20pm
						5/Pest/PCB	B Lewan	5/16/97	K Hoffman	5/16/97	2:40pm

AR300768

X

USEPA ERT **CHAIN OF CUSTODY RECORD** Henry **COC # 1-215-019**

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 2
Cooler #:NA
Lab: REAC Biology Lab
Contact: Anthony LoSurdo
(908) 321-4200

05/6 97

	LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested		MS MSD	Comments
23	185	A	11-215-00066 ✓	Sulfate Basin No. 5	WHOLE BODY	5/15/97	8oz glass/4 C	TAL/PCB/PEST			TAL AS
	186	A	11-215-00120	Reference	WHOLE BODY	5/15/97	8oz glass/4 C	TAL/PCB/PEST			
	187	A	11-215-00121	BMI-1	WHOLE BODY	5/15/97	8oz glass/4 C	TAL/PCB/PEST			
	188	A	11-215-00122	BMI-2	WHOLE BODY	5/15/97	8oz glass/4 C	TAL/PCB/PEST			
	189	A	11-215-00123	BMI-3	WHOLE BODY	5/15/97	8oz glass/4 C	TAL/PCB/PEST	f. Ry		
	190	A	11-215-00124	BMI-4	WHOLE BODY	5/15/97	8oz glass/4 C	TAL/PCB/PEST	5/1?/97		
	191	A	11-215-00125	BMI-5	WHOLE BODY	5/15/97	8oz glass/4 C	TAL/PCB/PEST			
185	192	A	11-215-00219 ✓	FA-10-8	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	22.5		
186	193	A	11-215-00220 ✓	REF-1-8	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	20.5		
187	194	A	11-215-00221 ✓	REF-1-17	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	14		
188	195	A	11-215-00222 ✓	FA-11-21	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	24.5		
189	196	A	11-215-00223 ✓	FA-10-9	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	26.5		
190	197	A	11-215-00224 ✓	REF-5-20	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	16.5		
191	198	A	11-215-00225 ✓	REF-5-19	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	11.5		
192	199	A	11-215-00226 ✓	REF-2-12	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	13		
193	200	A	11-215-00227 ✓	FA-10-10	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	30.5		
194	201	A	11-215-00228 ✓	FA-11-2	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	19.5		
195	202	A	11-215-00229 ✓	REF-6-10	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	22.5		
196	203	A	11-215-00230 ✓	FA-10-18	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	17.5		
197	204	A	11-215-00231 ✓	TP-1-2	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	36		TAL MS

BC

Special Instructions: For samples 120-125, please see Rick Henry for analysis

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/15	B Lewa	5/16/97	0930	All/Analysis	B Lewa	5/16/97	Y. [illegible]	5/16/97	10:15
All/Analysis	[illegible]	5/19/97	B Lewa	5/19/97	1510	All/Metals	B Lewa	5/19/97	[illegible]	5/19/97	3:20 pm

[redacted]

AR300769

X

USEPA ERT | **CHAIN OF CUSTODY RECORD** | **COC # 1-215-020**

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022
051697

Project Name: Aviex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 2 of 2
Cooler #:
Lab: REAC Biology Lab
Contact: Tony LoSurdo
(908) 321-4200

000175

[redacted]

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested		MS MSD	Comments
198	A	11-215-00232 ✓	TP-1-1	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	49	—	
199	A	11-215-00233 ✓	TP-2-2	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	28.5		
200	A	11-215-00234 ✓	REF-6-9	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	64	—	
201	A	11-215-00235 ✓	WA-North-20	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	25.5		
202	A	11-215-00236 ✓	WA-South-17	WHOLE BODY	5/15/97	Foil/4C	TAL/PCB/PEST	23.5		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
All/analyses	Mark Huston	5/15/97	B Lewan	5/16/97	0930	All / Analysis	B Lewan	5/16/97	Y. Nemeth	5/16/97	10:15
All/Ana[illegible]	J Domaszeg	5/19/97	B Lewan	5/19/97	1510	All / Metals	B Lewan	5/19/97	[illegible]	5/19/97	3:21 pm

AR300770

\C, Edison, NJ
lact: Mark Huston
) 321-4285
#: 03347-041-001-1215-01
Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Cooler #:NA
Lab: Southwest Labs of Oklahoma
Contact: Dave LeMaster
(918)251-2858

AB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	E	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	8 oz glass/wet ice, 4C	Volatiles		
	E	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	8 oz glass/wet ice, 4C	Volatiles		
	C	11-215-00046	Sulfate Basin No. 5	Water	5/12/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00046	Sulfate Basin No. 5	Water	5/12/97	40 ml VOA/4C	Volatiles		
	E	11-215-00046	Sulfate Basin No. 5	Water	5/12/97	40 ml VOA/4C	Volatiles		
	C	11-215-00047	Fly Ash Basin No. 4	Water	5/12/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00047	Fly Ash Basin No. 4	Water	5/12/97	40 ml VOA/4C	Volatiles		
	E	11-215-00047	Fly Ash Basin No. 4	Water	5/12/97	40 ml VOA/4C	Volatiles		
	D	11-215-00401	Reference	Sediment	5/13/97	8 oz glass/wet ice, 4C	Volatiles		
	D	11-215-00402	BMI-2	Sediment	5/13/97	8 oz glass/wet ice, 4C	Volatiles		
	D	11-215-00403	BMI-3	Sediment	5/13/97	8 oz glass/wet ice, 4C	Volatiles		
[redacted]	D	11-215-00404	BMI-4	Sediment	5/13/97	8 oz glass/wet ice, 4C	Volatiles		
	D	11-215-00405	BMI-5	Sediment	5/13/97	8 oz glass/wet ice, 4C	Volatiles		
	D	11-215-00406	BMI-6	Sediment	5/13/97	8 oz glass/wet ice, 4C	Volatiles		
	D	11-215-00407	BMI-1	Sediment	5/13/97	8 oz glass/wet ice, 4C	Volatiles		
	A	11-215-00408	Field Blank		5/14/97	40 ml VOA/wet ice, 4C	Volatiles		
	A	11-215-00409	Trip Blank		5/14/97	40 ml VOA/wet ice, 4C	Volatiles		
	C	11-215-00410	Reference	Water	5/14/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00410	Reference No. 2	Sediment	5/15/97	4 oz glass/wet ice, 4C	Volatiles		
	D	11-215-00410	Reference	Water	5/14/97	40 ml VOA/4C	Volatiles		

'al Instructions:

REFERENCE COC:

s/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
analyses	Mark Huston	5/16/97	[illegible]	5/17/97	0800						

G231 0002

EPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-2[illegible]5-024

AC, Edison, NJ
ntact: Mark Huston
8) 321-4285
O#: 03347-041-001-1215-01
A Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 2 of 4
Cooler #:NA
Lab: Southwest Labs of Oklahoma
Contact: Dave LeMaster
(918)-251-2858

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	E	11-215-00410	Reference	Water	5/14/97	40 ml VOA/4C	Volatiles		
	C	11-215-00411	BMI-1	Water	5/14/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00411	BMI-1	Water	5/14/97	40 ml VOA/4C	Volatiles		
	E	11-215-00411	BMI-1	Water	5/14/97	40 ml VOA/4C	Volatiles		
	C	11-215-00412	BMI-2	Water	5/14/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00412	BMI-2	Water	5/14/97	40 ml VOA/4C	Volatiles		
	E	11-215-00412	BMI-2	Water	5/14/97	40 ml VOA/4C	Volatiles		
	C	11-215-00413	BMI-3	Water	5/14/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00413	BMI-3	Water	5/14/97	40 ml VOA/4C	Volatiles		
	E	11-215-00413	BMI-3	Water	5/14/97	40 ml VOA/4C	Volatiles		
	C	11-215-00414	Outfall 004	Water	5/14/97	40 ml VOA/4 C	Volatiles	Y	
[redacted]	D	11-215-00414	Outfall 004	Water	5/14/97	40 ml VOA/4C	Volatiles	Y	
	E	11-215-00414	Outfall 004	Water	5/14/97	40 ml VOA/4C	Volatiles	Y	
	C	11-215-00415	Outfall 005	Water	5/14/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00415	Outfall 005	Water	5/14/97	40 ml VOA/4C	Volatiles		
	E	11-215-00415	Outfall 005	Water	5/14/97	40 ml VOA/4C	Volatiles		
	A	11-215-00417	Trip Blank	Water	5/14/97	40 ml VOA/4 C	Volatiles		
	B	11-215-00417	Trip Blank	Water	5/14/97	40 ml VOA/4C	Volatiles		
	C	11-215-00417	Trip Blank	Water	5/14/97	40 ml VOA/4C	Volatiles		
	A	11-215-00418	Field Blank	Water	5/14/97	40 ml VOA/4 C	Volatiles		

G231 0003

ial Instructions:

REFERENCE COC:

s/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
/or analysis	Mark Huston	5/16/97	[illegible]	5/17/97	0800						

AC, Edison, NJ
ntact: Mark Huston
8) 321-4285
O#: 03347-041-001-1215-01
A Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Cooler #:NA
Lab: Southwest Labs of Oklahoma
Contact: Dave LeMaster
(918)-251-2858

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	B	11-215-00418	Field Blank	Water	5/14/97	40 ml VOA/4C	Volatiles		
	C	11-215-00418	Field Blank	Water	5/14/97	40 ml VOA/4C	Volatiles		
	C	11-215-00419	Reference No.2	Water	5/15/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00419	Reference No.2	Water	5/15/97	40 ml VOA/4C	Volatiles		
	E	11-215-00419	Reference No.2	Water	5/15/97	40 ml VOA/4C	Volatiles		
	E	11-215-00501	Reference	Soil	5/15/97	4 oz glass/wet ice, 4C	Volatiles		
	E	11-215-00502	Wetland Area	Soil	5/15/97	4 oz glass/wet ice, 4C	Volatiles	Y	
	E	11-215-00503	Emergency Pond	Soil	5/15/97	4 oz glass/wet ice, 4C	Volatiles		
	E	11-215-00504	PCB Area	Soil	5/15/97	4 oz glass/wet ice, 4C	Volatiles		
	E	11-215-00505	Treatment Plant	Soil	5/15/97	4 oz glass/wet ice, 4C	Volatiles		
	E	11-215-00506	Fly Ash Pile	Soil	5/15/97	4 oz glass/wet ice, 4C	Volatiles		
	C	11-215-00601	Sulfate Basin No. 1	Water	5/14/97	40 ml VOA/4 C	Volatiles		
[redacted]	D	11-215-00601	Sulfate Basin No. 1	Water	5/14/97	40 ml VOA/4C	Volatiles		
	E	11-215-00601	Sulfate Basin No. 1	Water	5/14/97	40 ml VOA/4C	Volatiles		
	C	11-215-00602	Emergency Pond	Water	5/14/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00602	Emergency Pond	Water	5/14/97	40 ml VOA/4C	Volatiles		
	E	11-215-00602	Emergency Pond	Water	5/14/97	40 ml VOA/4C	Volatiles		
	C	11-215-00603	Polish Pond	Water	5/14/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00603	Polish Pond	Water	5/14/97	40 ml VOA/4C	Volatiles		
	E	11-215-00603	Polish Pond	Water	5/14/97	40 ml VOA/4C	Volatiles		

G231 0004

ial Instructions:

REFERENCE COC:

s/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
ll analyses	Mark Huston	5/16/97	[illegible]	5/17/97	0800						

13

EPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-[illegible]5-026

AC, Edison, NJ
ntact: Mark Huston
6) 321-4285
)#: 03347-041-001-1215-01
A Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 4 of 4
Cooler #:NA
Lab: Southwest Labs of Oklahoma
Contact: Dave Lemaster
(918)-251-2858

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	C	11-215-00604	Outfall 004	Water	5/14/97	40 ml VOA/4 C	Volatiles		
	D	11-215-00604	Outfall 004	Water	5/14/97	40 ml VOA/4C	Volatiles		
	E	11-215-00604	Outfall 004	Water	5/14/97	40 ml VOA/4C	Volatiles		
	D	11-215-00605	Sulfate Basin No. 1	Sediment	5/14/97	8 oz glass/wet ice, 4C	Volatiles	Y	
	D	11-215-00606	Emergency Pond	Sediment	5/14/97	8 oz glass/wet ice, 4C	Volatiles		
	D	11-215-00607	Polishing Pond	Sediment	5/14/97	8 oz glass/wet ice, 4C	Volatiles		
	D	11-215-00608	Viscose Creek	Sediment	5/14/97	8 oz glass/wet ice, 4C	Volatiles		

00273

G231 0005

ial Instructions:

REFERENCE COC:

is/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
/analyses	Mark Huston	5/16/97	[illegible]	5/17/97	0800						

AR300774

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022
051997

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Cooler #:007188
Lab: REAC Laboratory
Contact: Mark Huston
(908) 321-4285

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
48 348	A	11-215-00237	TP-4A-8	WHOLE BODY	5/16/97	Foil/4C	TAL/PCB/PEST		
349	A	11-215-00410	Reference No. 2	Sediment	5/15/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
49 350	B	11-215-00410	Reference No. 2	Sediment	5/15/97	8 oz glass/wet ice, 4C	metals, TAL		
351	A	11-215-00501	Reference	Soil	5/15/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
50 352	B	11-215-00501	Reference	Soil	5/15/97	8 oz glass/wet ice, 4C	metals, TAL		
353	D	11-215-00501	Reference	Soil	5/15/97	8 oz glass/wet ice, 4C	Base neutral/acid extractables		
354	A	11-215-00502	Wetland Area	Soil	5/15/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
51 355	B	11-215-00502	Wetland Area	Soil	5/15/97	8 oz glass/wet ice, 4C	metals, TAL		
BL	D	11-215-00502	Wetland Area	Soil	5/15/97	8 oz glass/wet ice, 4C	Base neutral/acid extractables		
	A	11-215-00503	Emergency Pond	Soil	5/15/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
52	B	11-215-00503	Emergency Pond	Soil	5/15/97	8 oz glass/wet ice, 4C	metals, TAL		
	D	11-215-00503	Emergency Pond	Soil	5/15/97	8 oz glass/wet ice, 4C	Base neutral/acid extractables		
BL	A	11-215-00504	PCB Area	Soil	5/15/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
344	D	11-215-00504	PCB Area	Soil	5/15/97	8 oz glass/wet ice, 4C	Base neutral/acid extractables		
BL	A	11-215-00505	Treatment Plant	Soil	5/15/97	8 oz glass/wet ice, 4C	Pesticides/PCB	Y	
345	D	11-215-00505	Treatment Plant	Soil	5/15/97	8 oz glass/wet ice, 4C	Base neutral/acid extractables	Y	
346	A	11-215-00506	Fly Ash Pile	Soil	5/15/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
BL	D	11-215-00506	Fly Ash Pile	Soil	5/15/97	8 oz glass/wet ice, 4C	Base neutral/acid extractables		
BL	A	11-215-00507	Blank	Soil	5/15/97	4 oz glass/wet ice, 4C	Pesticides/PCB		
347	C	11-215-00507	Blank	Soil	5/15/97	4 oz glass/wet ice, 4C	Base neutral/acid extractables		

G234 0017

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/16/97	B Lewa	5/19/97	0845	1 Homogenization	B Lewa	5/19/97	[illegible]	5/19/97	0845
4/Metals	B Lewa	5/19/97							[illegible]	5/19/97	11:45 am
15/Pest/PCB BNA	B Lewa	5/19/97	R. [illegible]	5/19/97	1:25 pm						

[redacted]

COC # 1-215-038

REAC, Edison NJ
Contact: Ma[illegible]ston
(908) 321-4265
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Nr Aviex Fibers Site
Location: Front Royal, Va
Site Phone:

Page no.: 2 of 2
Cooler #:007166
Lab: REAC Laboratory
Contact: Mark Huston
(908) 321-4265

051997

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
344	B	11-215-00504	PCB Area	Soil	5/15/97	8 oz glass/wet ice, 4C	metals, TAL		
345	B	11-215-00505	Treatment Plant	Soil	5/15/97	8 oz glass/wet ice, 4C	metals, TAL	Y	
346	B	11-215-00506	Fly Ash Pile	Soil	5/15/97	8 oz glass/wet ice, 4C	metals, TAL		
347	B	11-215-00507	Blank	Soil	5/15/97	4 oz glass/wet ice, 4C	metals, TAL		

[redacted]

G265 0020

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/16/97	B Lewa	5/19/97	0900 0845	All/Metals	B Lewa	5/19/97	[illegible]	5/19/97	11:50

ANALYTICAL REPORT

Prepared by
Roy F. Weston, Inc.

Avtex Fibers Site
Front Royal, Virginia

August, 1997

EPA Work Assignment No. 2-215
WESTON Work Order No. 03347-142-001-2215-01
EPA Contract No. 68-C4-0022

Submitted to
M. Sprenger
EPA-ERTC

Mark Huston 8/22/97
M. Huston — Date
Task Leader

Vinod Kansal 8/25/97
V. Kansal — Date
Analytical Section Leader

Dan Crone for EG 8/26/97
E. Gilardi — Date
Program Manager

Analysis by:
REAC
Environmental Science and Engineering

Prepared by:
D. Laviska

Reviewed by:
M. Barkley

\2215\DEL\AR\9708\AVTEXFAR

Introduction

REAC in response to WA #2-215, provided analytical support for environmental samples collected from the Avtex [illegible] Si located in Front Royal, Virginia as described in the following table. The support also included QA/QC, data revie[illegible]d preparation of an analytical report containing a summary of the analytical methods, the results, and the QA/QC results.

The samples were treated with procedures consistent with those specified in SOP #1008.

Chain of Custody	Number of Samples	Sampling Date	Date Received	Matrix	Analysis	Laboratory
1-215-021	2	05/12/97	05/16/97	Sediment/ Soil	TOC	Environmental Science and Engineering
	7	05/13/97				
	4	05/14/97				
	7	05/15/97				
COC01	24	06/18/97	06/25/97	Earthworm Tissue	PCBs, TAL Metals	REAC
00614	2	06/25/97	06/30/97	CO_2	TAL Metals	

Summary of Abbreviations

AA	Atomic Absorption
B	The analyte was found in the blank
BFB	Bromofluorobenzene
BPQL	Below the Practical Quantitation Limit
BS	Blank Spike
BSD	Blank Spike Duplicate
C	Centigrade
D	(Surrogate and MS/MSD Table) this value is from a diluted sample and was not calculated (Result Table) this result was obtained from a diluted sample
Dioxin	Denotes Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans and/or PCDD and PCDF
CLP	Contract Laboratory Protocol
COC	Chain of Custody
CONC	Concentration
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
DFTPP	Decafluorotriphenylphosphine
DL	Detection Limit
E	The value is greater than the highest linear standard and is estimated
EMPC	Estimated maximum possible concentration
ICAP	Inductively Coupled Argon Plasma
ISTD	Internal Standard
J	The value is below the method detection limit and is estimated
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MI	Matrix Interference
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MW	Molecular Weight
NA	either Not Applicable or Not Available
NC	Not Calculated
NR	Not Requested
NS	Not Spiked
% D	Percent Difference
% REC	Percent Recovery
PQL	Practical Quantitation Limit
PPBV	Parts per billion by volume
QL	Quantitation Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SIM	Selected Ion Mode
TCLP	Toxic Characteristics Leaching Procedure
U	Denotes not detected

m^3	cubic meter	kg	kilogram	μg	microgram
L	liter	g	gram	pg	picogram
mL	milliliter	mg	milligram		
μL	microliter				
*	denotes a value that exceeds the acceptable QC limit				

Abbreviations that are specific to a particular table are explained in footnotes on that table

Revision 3/5/97

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[redacted]

Analytical Procedure for PCBs in Tissue

Extraction Procedure

After homogenization, 10 grams of tissue sample was mixed with 30 grams of sodium sulfate, spiked with a surrogate soluti consisting of tetrachloro-m-xylene and decachlorobiphenyl, Soxhlet extracted for 16 hours with 250 mL methylene chloride, cleaned on GPC, solvent exchanged to hexane and concentrated to 1 mL. Additional florisil and acid cleanups were performed.

Gas Chromatographic Analysis

The extract was analyzed for PCBs using simultaneous dual column injections. The analysis was done on an HP 5890 GC/ECD system, equipped with an HP 7673A automatic sampler, and controlled with an HP-CHEM STATION. The following conditions were employed:

First Column	DB-608, 30 meter, 0.32mm fused silica capillary, 0.50µm film thickness
Injector Temperature	250 °C
Detector Temperature	325 °C
Temperature Program	150 °C for 1 minute 7 °C/min to 265 °C 18 min at 265 °C
Second Column	RTx-CLPest, 30 meter, 0.32mm fused silica capillary, 0.50µm film thickness
Injector Temperature	250 °C
Detector Temperature	325 °C
Temperature Program	150 °C for 1 minute 7 °C/min to 265 °C 18 min at 265 °C

The gas chromatographs were calibrated using 5 PCB standards at 0.1, 0.25, 0.5, 1, and 2µg/mL. The results from each mixture were used to calculate the response factor (RF) of each analyte and the average Response Factor was used to calcu the concentration of PCBs in the sample. Quantification was based on the DB-608 column (signal 1). Confirmation was ta from the secondary column (signal 2).

Analytical Procedure for TAL Metals in Tissue

Sample Preparation

A representative 0.5-1.5 g (wet weight) sample, weighed to 0.01 g accuracy, was thoroughly mixed with 10 ml 1:1 nitric acid, placed in an acid rinsed Teflon container and heated on a hot plate for 60-90 min at 60-65° C. The container was capped with a Teflon lined cap and digested on a CEM MDS-2000 microwave oven which was programmed in different stages. After digestion, the samples were allowed to cool to room temperanure, transferred to 50 mL volumetric flasks and diluted to 50 mL with ASTM type II water. The samples were analyzed for all metals, except mercury, by USEPA SW-846, Method 7000 (Atomic absorption) or Method 6010 (Inductively Coupled Argon Plasma-ICAP) procedures.

A representative 0.5-0.6 g (wet weight) sample aliquot, weighed to 0.01 g accuracy, was prepared and analyzed separately for mercury on a Varian SpectrAA-300 Atomic Absorption Spectrophotometer equipped with a Varian VGA-76 vapor gas analyzer according to SW-846, Method 7471.

A separate sample was used to determine total solids. A reagent blank and a blank spike sample were carried through the sample preparation procedure for each batch of samples processed. One matrix spike (MS) and one matrix spike duplicate (MSD) were analyzed for each batch or for every ten samples.

Analysis and Calculations

The AA and ICAP instruments were calibrated and operated according to SW-846, Method 7000/7471/6010 and the manufacturers operating instructions. After calibration, initial calibration verification (ICV), initial calibration blank (ICB) and quality control check standards were run to verify proper calibration. The continuing calibration verification (CCV) and continuing calibration blank (CCB) were run after every ten samples to verify proper operation during sample analysis.

The metal concentrations in solution, in micrograms per liter ($\mu g/L$) were taken from the read-out systems of the Atomic Absorption insuments. AA results in milligrams per kilogram (mg/kg) were obtained by externally correcting the reading for the sample weight and percent solids. The ICAP results (mg/kg) were corrected for sample weight prior to instrument read-out; the instrument read-out was then corrected for percent solids.

Analytical Procedure for TOC in Soil

The subcontracted laboratory determined the total organic carbon content in soil samples by using AASHTO Method T 267- for the "Determination of Organic Content in Soils by Loss on Ignition."

Results of the analysis are listed in Table 1.3.

Table 1.1 (cont.) Results of the Analysis for PCBs in Tissue
WA# 2-215 Avtex Fibers Site
Based on dry weight

Client ID	Lab control 2C		11-215-00501A		11-215-00501B		11-215-00501C		11-215-00502A	
Location	N/A		N/A		N/A		N/A		N/A	
Percent Solid	9		11		13		13		9	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
Aroclor 1016	U	210	U	240	U	150	U	150	U	210
Aroclor 1221	U	430	U	470	U	310	U	290	U	420
Aroclor 1232	U	210	U	240	U	150	U	150	U	210
Aroclor 1242	U	210	U	240	U	150	U	150	U	210
Aroclor 1248	350 W	210	210 WJ	240	200 W	150	160 W	150	240 W	210
Aroclor 1254	U	210	U	240	U	150	U	150	U	210
Aroclor 1260	U	210	U	240	U	150	U	150	U	210

W denotes "weathered"

Table 1.1 (cont.) Results of the Analysis for PCBs in Tissue
WA# 2-215 Avtex Fibers Site
Based on dry weight

Client ID	11-215-00504A		11-215-00504B		11-215-00504C		11-215-00505B		11-215-00505C	
Location	N/A		N/A		N/A		N/A		N/A	
Percent Solid	11		10		9		11		10	
Analyte	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg	µg/kg	MDL µg/kg
Aroclor 1016	U	180	U	190	U	220	U	180	U	200
Aroclor 1221	U	350	U	390	U	430	U	360	U	390
Aroclor 1232	U	180	U	190	U	220	U	180	U	200
Aroclor 1242	U	180	U	190	U	220	U	180	U	200
Aroclor 1248	540 W	180	500 W	190	510 W	220	220 W	180	200 W	200
Aroclor 1254	2800 W	180	2600 W	190	2200 W	220	47 WJ	180	37 WJ	200
Aroclor 1260	81 WJ	180	59 WJ	190	54 WJ	220	53 WJ	180	62 WJ	200

W denotes "weathered"

Table 1.1 (cont.) Results of the Analysis for PCBs in Tissue
WA# 2-215 Avtex Fibers Site
Based on dry weight

Client ID 11-215-00505A
Location N/A
Percent Solid 12

Analyte	µg/kg	MDL µg/kg
Aroclor 1016	U	170
Aroclor 1221	U	330
Aroclor 1232	U	170
Aroclor 1242	U	170
Aroclor 1248	200 W	170
Aroclor 1254	45 WJ	170
Aroclor 1260	64 WJ	170

W denotes "weathered"

Table 1.2 (cont.) Results of the Analysis for TAL Metals in Tissue
WA# 2-215 Avtex Fibers Site
Based on dry weight

Client ID		Lab Control 2B		Lab Control 2C		11-215-00501A		11-215-00501B		11-215-00501C		11-215-00502A	
Location		Earthworm tissue		Earthworm tissue		Earthworm tissue		Earthworm tissue		Earthworm tissue		Earthworm tissue	
% Solids		10		9		11		11		13		9	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	240	49	720	56	100	49	190	50	160	41	1600	54
Antimony	AA-Fur	U	2.0	U	2.3	U	2.0	U	2.0	U	1.7	U	2.2
Arsenic	AA-Fur	U	2.0	2.8	2.3	2.6	2.0	2.7	2.0	2.6	1.7	3.4	2.2
Barium	ICAP	3.1	3.0	4.9	3.4	6.2	3.0	5.0	3.0	4.6	2.5	15	3.3
Beryllium	ICAP	U	2.0	U	2.3	U	2.0	U	2.0	U	1.7	U	2.2
Cadmium	ICAP	. U	3.0	U	3.4	U	3.0	U	3.0	U	2.5	U	3.3
Calcium	ICAP	3500	98	3900	110	4500	99	4300	100	4500	83	4600	110
Chromium	ICAP	U	4.9	U	5.6	U	4.9	U	5.0	U	4.1	U	5.4
Cobalt	ICAP	7.4	4.9	6.5	5.6	5.4	4.9	6.4	5.0	6.7	4.1	9.3	5.4
Copper	ICAP	12	4.9	29	5.6	12	4.9	13	5.0	17	4.1	26	5.4
Iron	ICAP	290	25	310	28	360	25	500	25	440	21	2600	27
Lead	AA-Fur	U	2.0	U	2.3	U	2.0	U	2.0	U	1.7	U	2.2
Magnesium	ICAP	950	490	940	560	820	490	910	500	830	410	900	540
Manganese	ICAP	17	2.0	16	2.3	15	2.0	14	2.0	14	1.7	21	2.2
Mercury	Cold Vapor	U	0.42	U	0.49	U	0.41	U	0.42	U	0.28	U	0.45
Nickel	ICAP	U	9.8	U	11	U	9.9	U	10	U	8.3	U	11
Potassium	ICAP	9600	2000	8800	2300	8200	2000	9000	2000	8500	1700	8700	2200
Selenium	AA-Fur	3.6	2.0	2.8	2.3	5.4	2.0	4.7	2.0	3.7	1.7	4.0	2.2
Silver	ICAP	U	4.9	U	5.6	U	4.9	U	5.0	U	4.1	U	5.4
Sodium	ICAP	5300	490	5300	560	4200	490	4800	500	5200	410	4700	540
Thallium	AA-Fur	U	2.0	U	2.3	U	2.0	U	2.0	U	1.7	U	2.2
Vanadium	ICAP	U	4.9	U	5.6	U	4.9	U	5.0	U	4.1	U	[illegible]
Zinc	ICAP	130	4.9	110	5.6	130	4.9	120	5.0	110	4.1	120	[illegible]

Table 1.2 (cont.) Results of the Analysis for TAL Metals in Tissue
WA# 2-215 Avtex Fibers Site
Based on dry weight

Client ID		11-215-00504B		11-215-00504C		11-215-00505A		11-215-00505B		11-215-00505C		11-215-00506A	
Location		Earthworm tissue		Earthworm tissue		Earthworm tissue		Earthworm tissue		Earthworm tissue		Earthworm tissue	
% Solids		10		9		12		11		10		11	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	280	55	140	55	880	44	470	47	550	49	700	53
Antimony	AA-Fur	U	2.2	U	2.2	U	1.8	U	1.9	U	2.0	U	2.1
Arsenic	AA-Fur	3.0	2.2	2.7	2.2	7.4	1.8	2.8	1.9	2.0	2.0	26	2.1
Barium	ICAP	U	3.3	U	3.3	10	2.6	7.8	2.8	7.6	2.9	62	3.2
Beryllium	ICAP	U	2.2	U	2.2	U	1.7	U	1.9	U	2.0	U	2.1
Cadmium	ICAP	U	3.3	U	3.3	U	2.6	U	2.8	U	2.9	U	3.2
Calcium	ICAP	5700	110	5500	110	4300	87	3600	94	3700	98	3600	110
Chromium	ICAP	U	5.5	U	5.5	U	4.4	U	4.7	6.5	4.9	U	5.3
Cobalt	ICAP	6.4	5.5	U	5.5	9.7	4.4	5.8	4.7	U	4.9	6.2	5.3
Copper	ICAP	15	5.5	12	5.5	18	4.4	32	4.7	26	4.9	14	5.3
Iron	ICAP	510	28	400	28	1300	22	870	24	720	24	1700	27
Lead	AA-Fur	U	2.2	U	2.2	U	1.8	U	1.9	U	2.0	2.2	2.1
Magnesium	ICAP	880	550	890	550	1100	440	920	470	960	490	950	530
Manganese	ICAP	15	2.2	8.4	2.2	67	1.7	58	1.9	47	2.0	15	2.1
Mercury	Cold Vapor	U	0.42	U	0.47	U	0.33	U	0.35	U	0.41	U	0.4
Nickel	ICAP	U	11	U	11	U	8.7	U	9.4	U	9.8	U	11
Potassium	ICAP	8000	2200	7400	2200	9800	1700	8400	1900	8700	2000	9100	2100
Selenium	AA-Fur	4.2	2.2	3.6	2.2	4.7	1.8	3.7	1.9	4.1	2.0	8.1	2.1
Silver	ICAP	U	5.5	U	5.5	U	4.4	U	4.7	U	4.9	U	5.3
Sodium	ICAP	5500	550	6000	550	5300	440	4800	470	5200	490	4500	530
Thallium	AA-Fur	U	2.2	U	2.2	U	1.8	U	1.9	U	2.0	U	2.1
Vanadium	ICAP	U	5.5	U	5.5	U	4.4	U	4.7	U	4.9	U	5.3
Zinc	ICAP	180	5.5	120	5.5	170	4.4	150	4.7	150	4.9	130	5.3

Table 1.3 Results of the Analysis for TOC in Soil
WA # 2-215 Avtex Fibers Site
Based on dry weight

SAMPLE # :	Lab Control 1	11-215-00044	11-215-00045	11-215-00401	11-215-00402	11-215-0040
LOCATION :	---	Sulfate Basin #5	Fly Ash Basin #4	Reference	BMI-2	BMI-3
UNIT :	%	%	%	%	%	%
LOI	<0.50	32.6	13.8	12.2	4.5	1.0

SAMPLE # :	11-215-00404	11-215-00405	11-215-00406	11-215-00407	11-215-00410	11-215-006(
LOCATION :	BMI-4	BMI-5	BMI-6	BMI-1	Reference #2	Sulfate Basin
UNIT :	%	%	%	%	%	%
LOI	2.0	2.2	1.0	4.8	4.0	10.2

SAMPLE # :	11-215-00606	11-215-00607	11-215-00608	Lab Control #2	11-215-00501	11-215-005
LOCATION :	Emergency Pond	Polishing Pond	Viscose Creek	---	Reference	Wetland Ar
UNIT :	%	%	%	%	%	%
LOI	1.9	9.8	5.7	N/A	6.8	3.8

SAMPLE # :	11-215-00503	11-215-00504	11-215-00505	11-215-00506
LOCATION :	Emergency Pond	PCB Area	Treatment Plant	Fly Ash Pile
UNIT :	%	%	%	%
LOI	17.1	4.7	8.1	29.4

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QA/QC for PCBs in Tissue

Results of the Surrogate Recoveries for PCBs in Tissue

Prior to extraction, each sample was spiked with a two component surrogate mixture consisting of decachlorobiphenyl and tetrachloro-m-xylene. The surrogate percent recoveries, listed in Table 2.1, ranged from 47 to 121. Fifty-seven out of sixty recoveries were within acceptable QC limits.

Results of the MS/MSD Analysis for PCBs in Tissue

The samples lab control 1A and 11-215-00505A were chosen for the matrix spike/matrix spike duplicate (MS/MSD) analysis. The percent recoveries, listed in Table 2.2, ranged from 73 to 85. All four recoveries were within acceptable QC limits. The relative percent differences (RPDs), also listed in Table 2.2, were 7 and 13. Both RPD values were within acceptable QC limits.

Table 2.2 Results of the MS/MSD Analysis for PCBs in Tissue
WA#2-215 Avtex Fibers Site
Based on dry weight

Sample ID: Lab control 1A

Compound	Sample Conc (µg/kg)	MS Spike Added (µg/kg)	M S Conc (µg/kg)	MS % Rec	MSD Spike Added (µg/kg)	MSD Conc (µg/kg)	MSD % Rec	RPD	Advisory QC Limits % Rec	RP
Ar. 1254	U	1010.10	860.76	85	1010.10	755.83	75	13	46-127	5

QA/QC for TAL Metals in Tissue

Results of the QC Standard Analysis for TAL Metals (Tissue)

The percent recoveries for the TAL metals found in the QC standards (QC-21x100, QC-7x100, TMMA#1, TMMA#2, TMWS, and ERA-431), listed in Table 2.3, ranged from 96 to 111. There are 95% confidence interval limits available for 19 of the 36 recovered concentrations. All 19 recovered concentrations were within acceptable QC limits. There are no 95% confidence interval limits available for the remaining 17 recovered concentrations.

Results of the MS/MSD Analysis for TAL Metals in Tissue

The samples Lab control 1C and 11-215-00505C were used for the MS/MSD analysis. The percent recoveries, shown in Table 2.4, ranged from 70 to 155. The values for relative percent difference (RPD), also listed in Table 2.4, ranged from 0 (zero) to 60. No QC limits for either percent recovery or relative percent difference are available for this analysis.

Results of the Blank Spike Analysis for TAL Metals in Tissue

The percent recoveries for the blank spike analysis, shown in Table 2.5, ranged from 83 to 114. No QC limits are available for this analysis.

Table 2.4 Results of the MS/MSD Analysis for TAL Metals in Tissue
WA# 2-215 Avtex Fibers Site
Based on dry weight

Metal	Client #	Sample Conc. mg/kg	Original Conc. Spike mg/kg	Original Conc. Dup. mg/kg	Recovered Conc. Spike mg/kg	Recovered Conc. Dup. mg/kg	% Recovery Spike	% Recovery Dup.	RPD
Antimony	Lab Control 1C	U	18.2	18.5	15.6	16	86	86	0
Antimony	11-215-00505C	U	24.0	24.4	21	20.5	88	84	4
Arsenic	Lab Control 1C	1.93	18.2	18.5	19.5	19	97	92	5
Arsenic	11-215-00505C	1.96	24.0	24.4	24.4	24.6	94	93	1
Barium	Lab Control 1C	1.92	72.6	74.1	66.6	69.2	89	91	2
Barium	11-215-00505C	7.64	95.9	97.7	100	97.3	96	92	5
Beryllium	Lab Control 1C	U	72.6	74.1	66	66.8	91	90	1
Beryllium	11-215-00505C	U	95.9	97.7	92.9	92.2	97	94	3
Cadmium	Lab Control 1C	2.13	72.6	74.1	60.9	61.1	81	80	2
Cadmium	11-215-00505C	0.832	95.9	97.7	85.7	83.5	89	85	5
Chromium	Lab Control 1C	U	72.6	74.1	65.9	65.9	91	89	2
Chromium	11-215-00505C	6.48	95.9	97.7	94.2	88.7	92	84	[illegible]
Cobalt	Lab Control 1C	4.51	72.6	74.1	68.7	67.3	88	85	4
Cobalt	11-215-00505C	4.44	95.9	97.7	97.5	95.9	97	94	4
Copper	Lab Control 1C	11.4	72.6	74.1	75.9	76.9	89	88	[illegible]
Copper	11-215-00505C	25.8	95.9	97.7	116	117	94	93	[illegible]
Lead	Lab Control 1C	3.34	18.2	18.5	16.8	16.4	74	70	[illegible]
Lead	11-215-00505C	1.56	24.0	24.4	21.5	23.2	83	89	[illegible]
Manganese	Lab Control 1C	17.6	72.6	74.1	80.9	81.6	87	86	[illegible]
Manganese	11-215-00505C	46.6	95.9	97.7	146	133	104	88	1[illegible]
Mercury	Lab Control 1C	U	2.97	2.74	2.97	2.74	100	100	0
Mercury	11-215-00505C	0.203	3.99	3.99	4.19	4.19	100	100	0
Nickel	Lab Control 1C	1.1	72.6	74.1	66.4	65.3	90	87	4
Nickel	11-215-00505C	4.41	95.9	97.7	94.1	94.9	94	93	1
Selenium	Lab Control 1C	3.17	18.2	18.5	20.6	21.2	96	97	
Selenium	11-215-00505C	4.14	24.0	24.4	27.6	27.4	98	95	
Silver	Lab Control 1C	U	72.6	74.1	61.2	61.3	84	83	
Silver	11-215-00505C	U	95.9	97.7	86.7	86.8	90	89	
Thallium	Lab Control 1C	U	18.2	18.5	18.2	18.5	100	100	
Thallium	11-215-00505C	U	24.0	24.4	23.7	24.6	99	101	
Vanadium	Lab Control 1C	U	72.6	74.1	66.2	66.6	91	90	
Vanadium	11-215-00505C	1.31	95.9	97.7	96.8	93.3	100	94	
Zinc	Lab Control 1C	133	72.6	74.1	187	186	74	71	
Zinc	11-215-00505C	155	95.9	97.7	304	237	155	84	6

QST Environmental Inc.
Toxicology Laboratory
Gainesville, Florida

QST Form No. COC01
Revised: June 1997

62597

CHAIN OF CUSTODY RECORD

Client: Roy F. Weston, Inc
Project Name: Avtex Fibers Superfund Site

	Sample #	Tag	Matrix	Collected	Container/Preservative	Comments
547 ✓	Lab control 1	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	39.3 grams
548 ✓	"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	34.9 grams
549 ✓	"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	37.9 Grams
550 ✓	Lab control 2	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	36.4 Grams
551	"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	32.3 Grams
552 ✓	"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	36.6 Grams
553 ✓	11-215-00501	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	14.5 grams
554	"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	20.2 grams
555	"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	24.2 Grams
556	11-215-00502	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	28.2 grams
557	"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	26.1 grams
558	"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	30.4 [illegible]ns
559	11-215-00503	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	32.0 grams
560	"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	25.7 grams
561	"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	24.9 Grams
562	11-215-00504	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	24.5 grams
563	"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	25.8 grams
564	"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	22.6 gram
565	11-215-00505	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	37.0 grams
566	"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	32.9 gram
567	"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	33.6 grams
568	11-215-00506	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	15.2 grams ~~32.0 grams~~
569	"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	18.4 grams
570	"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	25.3 Grams

Relinquished By: Joe Owusu-Yaw Date: 6/24/97 Received By: Y. Exume Date: [illegible]25
Relinquished By: Y. Exume Date: 6/25/97 Received By: [illegible] Date: [illegible]/25
YExume 6/30/97 [illegible] 120: 6/30/97

00029 [redacted]

AR300793

USEPA ERT **CHAIN OF CUSTODY RECORD** **COC # 1-215-021**

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4265
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name Avtex Fibers Site
Location: Front Royal, Va
Site Phone

Page No 1 of 2
Cooler # COB172
Lab: ESE Inc
Contact: Joe Owusu Yaw
(302)332-3018

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS/MSD	Comments
	D	11-215-00044	Sulfate Basin No. 3	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	D	11-215-00045	Fly Ash Basin No.4	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00401	Reference	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00402	BMI-2	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00403	BMI-3	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00404	BMI-4	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00405	BMI-5	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00406	BMI-6	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00407	BMI-1	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00410	Reference No. 2	Sediment	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00501	Reference	Soil	5/15/97	8 oz glass/wet ice, 4C	TOC		
	D	11-215-00502	Wetland Area	Soil	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00503	Emergency Pond	Soil	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00504	PCB Area	Soil	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00505	Treatment Plant	Soil	5/16/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00506	Fly Ash Pile	Soil	5/16/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00806	Sulfate Basin No. 1	Sediment	5/14/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00805	Emergency Pond	Sediment	5/14/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00807	Polishing Pond	Sediment	5/14/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00808	Viscose Creek	Sediment	5/14/97	8 oz glass/wet ice, 4C	TOC		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all/analyses	Mark Huston	5/14/97									

000031

146738

FINAL ECOLOGICAL RISK ASSESSMENT

VOLUME II
Appendices E through H

AVTEX FIBERS SITE
FRONT ROYAL, WARREN COUNTY, VIRGINIA

FEBRUARY 1999

PREPARED BY:

Mark D. Sprenger, Ph.D.
Environmental Response Team Center

AND

Nancy J. Finley
U.S. Fish and Wildlife Service

Environmental Response Team Center
Office of Emergency and Remedial Response

[redacted]

APPENDIX E
Grain Size Analysis
Avtex Fibers Site
Front Royal, VA
February 1999

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	605

Sample Data

Mass of sample split on No. 10 sieve (g):	151.37
Mass retained on No. 10 sieve (g):	41.16
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.17
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	98.83

Hydrometer Test

Hydrometer type:	[illegible]
Hydrometer correction:	0.002
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.002

Values

K:	0.01365
W:	135.74
F:	36.9

[redacted]

[redacted]	605

Sieve Analysis

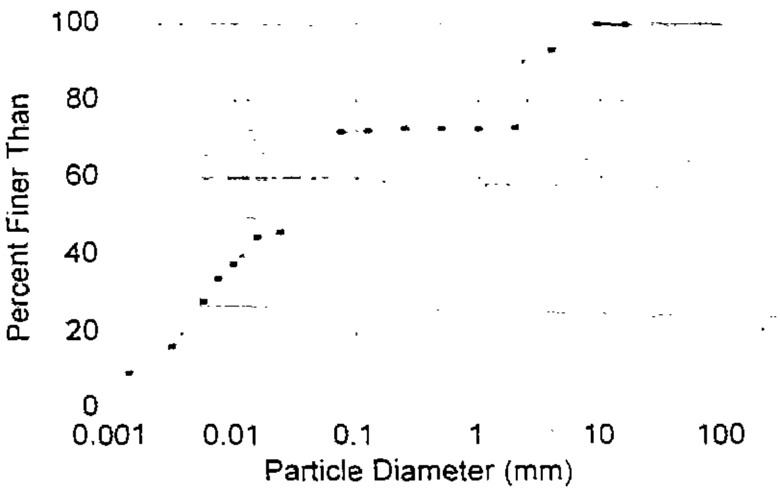
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	0.06	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	10.54	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	30.56	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.041	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.04	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.034	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.031	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.026	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.016	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.01	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]
[redacted]	0.04	[redacted]	[redacted]
[redacted]	0.03	[redacted]	[redacted]
[redacted]	0.60	[redacted]	[redacted]
[redacted]	0.47	[redacted]	[redacted]
TOTAL [redacted]	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	99.9
Course Sand	[redacted]	93.0
	[redacted]	73.17
Medium Sand	[redacted]	72.81
	[redacted]	72.7
Fine Sand	[redacted]	72.7
	[redacted]	72.3
	[redacted]	71.9
Silt	0.0236	46.1
	0.0153	44.
	0.0099	37.
	0.0073	34.
	0.0056	28.
Clay	0.0031	16.
	0.0014	9.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name: Brian Holderness
Date: 06/20/97

Site name: AVTEX
Sample No.: 401

Sample Data

Mass of sample split on No. 10 sieve (g):	206.59
Mass retained on No. 10 sieve (g):	82.34
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.57
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.57

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	99.25

Hydrometer Test

Hydrometer type:	
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01365
W:	[illegible]
F:	[illegible]

AR300799

[redacted]	401

Sieve Analysis

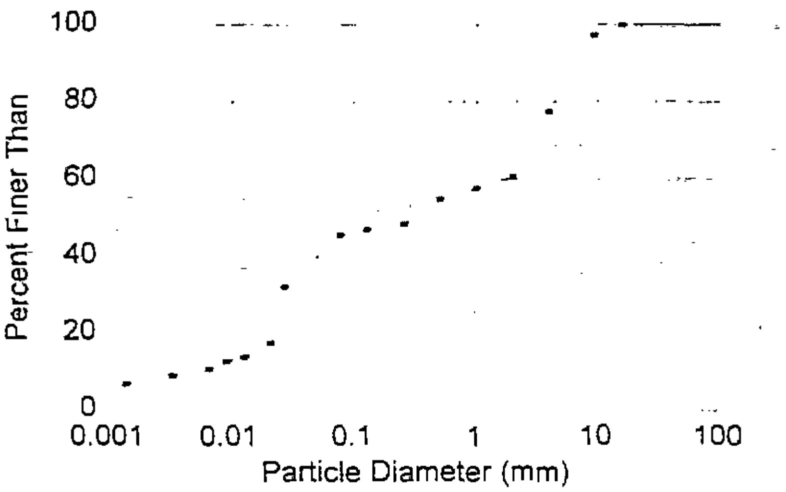
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	5.97	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	41.26	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	35.11	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.036	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.021	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.017	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.016	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.014	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.012	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.01	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	3.93	[redacted]	[redacted]
[redacted]	4.81	[redacted]	[redacted]
0.25	10.59	[redacted]	[redacted]
0.125	2.45	[redacted]	[redacted]
0.075	2.18	[redacted]	[redacted]
TOTAL	23.98		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0C
	[redacted]	97.1ξ
Course Sand	[redacted]	77.44
	[redacted]	60.67
Medium Sand	[redacted]	57.7E
	[redacted]	54.8ξ
Fine Sand	[redacted]	48.4
	[redacted]	46.9
	[redacted]	45.6
Silt	0.0265	32.1
	0.0207	17.5
	0.0125	13.6
	0.0089	12.6
	0.0064	10.7
Clay	0.0032	8.7
	0.0014	6.8

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	410

Sample Data

Mass of sample split on No. 10 sieve (g):	171.77
Mass retained on No. 10 sieve (g):	64.9
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.35
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.35

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01365
W:	[illegible]
F:	[illegible]

[redacted]

[redacted]	410

Sieve Analysis

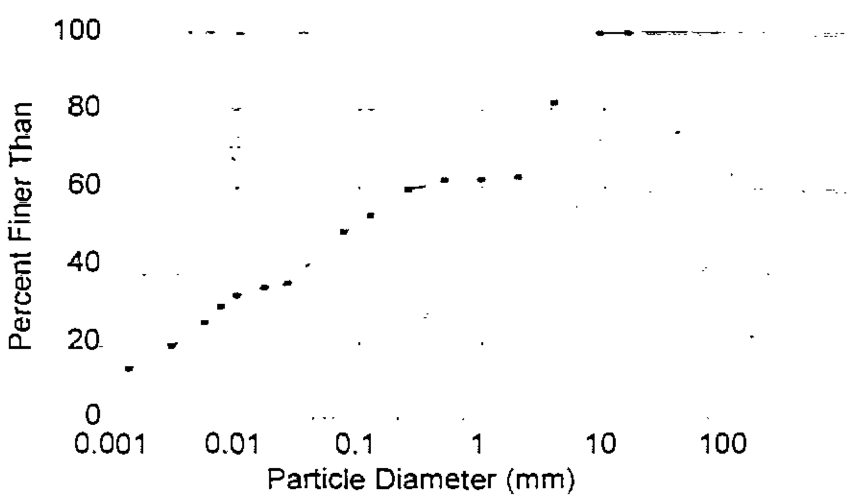
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	31.98	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	32.92	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.038	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.037	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.035	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.032	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.028	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.022	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.016	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.17	[redacted]	[redacted]
[redacted]	0.58	[redacted]	[redacted]
[redacted]	3.70	[redacted]	[redacted]
[redacted]	10.52	[redacted]	[redacted]
0.075	6.74	[redacted]	[redacted]
TOTAL [redacted]	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percen Finer
Fine Gravel	[redacted]	100.
	[redacted]	100.
Course Sand	[redacted]	81.
	[redacted]	62.
Medium Sand	[redacted]	62.
	[redacted]	61.
Fine Sand	[redacted]	59.
	[redacted]	52.
	[redacted]	48.
Silt	0.0256	35.
	0.0165	34
	0.0099	32
	0.0073	29
	0.0055	25
Clay	0.0029	19
	0.0013	13

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	403

Sample Data

Mass of sample split on No. 10 sieve (g):	148.51
Mass retained on No. 10 sieve (g):	2.16
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.53
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.002
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	[illegible]

Values

K:	0.01365
W:	[illegible]
F:	[illegible]

[redacted]

[redacted]	403

Sieve Analysis

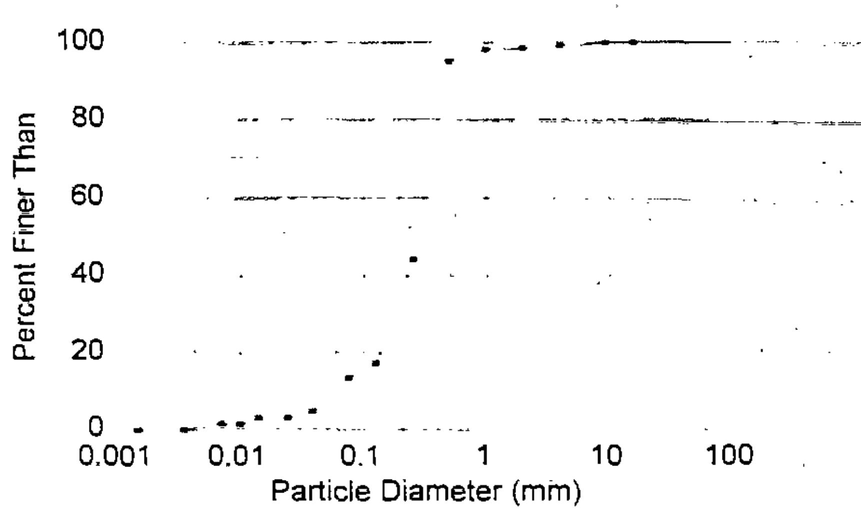
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]			
[redacted]	0.00	[redacted]			
[redacted]	1.33	[redacted]			
[redacted]	0.83	[redacted]			

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.005	[redacted]			
[redacted]	1.004	[redacted]			
[redacted]	1.004	[redacted]			
[redacted]	1.003	[redacted]			
[redacted]	1.003	[redacted]			
[redacted]	1.002	[redacted]			
[redacted]	1.002	[redacted]			

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.19	[redacted]	
[redacted]	3.37	[redacted]	
[redacted]	51.17	[redacted]	
[redacted]	26.97	[redacted]	
[redacted]	3.88	[redacted]	
TOTAL [redacted]			



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
		100.C
Course Sand		99.1
		98.5
Medium Sand		98.3
		95.0
Fine Sand		44.1
		17.
		13.
Silt	0.0380	4.
	0.0242	3.
	0.0140	3.
	0.0100	1.
	0.0071	1.
Clay	0.0035	0.
	0.0015	0.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	504

Sample Data

Mass of sample split on No. 10 sieve (g):	279.31
Mass retained on No. 10 sieve (g):	135.23
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.47
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.47

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	98.13

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.002
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.002

Values

K:	0.01365
W:	[illegible]
F:	[illegible]

[redacted]

[redacted]	504

Sieve Analysis

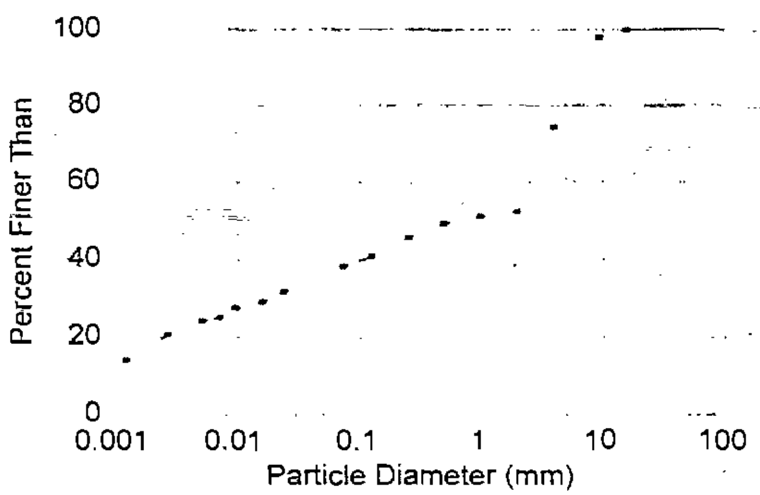
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	6.19	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	66.12	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	62.92	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.04	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.037	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.035	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.032	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.031	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.027	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.019	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.96	[redacted]	[redacted]
[redacted]	3.32	[redacted]	[redacted]
[redacted]	7.28	[redacted]	[redacted]
[redacted]	8.88	[redacted]	[redacted]
0.075	4.98	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percen Finer
Fine Gravel	[redacted]	100.
	[redacted]	97.
Course Sand	[redacted]	74.
	[redacted]	52.
Medium Sand	[redacted]	51.
	[redacted]	49.
Fine Sand	[redacted]	45.
	[redacted]	40.
	[redacted]	38.
Silt	0.0241	31
	0.0162	29
	0.0097	27
	0.0072	25
	0.0052	24
Clay	0.0027	20
	0.0012	14

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	407

Sample Data

Mass of sample split on No. 10 sieve (g):	162.92
Mass retained on No. 10 sieve (g):	15.65
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.7
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.7

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	1.33
Corrected mass of soil used in hydrometer test (g):	99.36

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.002
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.002

Values

K:	0.01365
W:	109.92
F:	10.56

[redacted]

[redacted]	407

Sieve Analysis

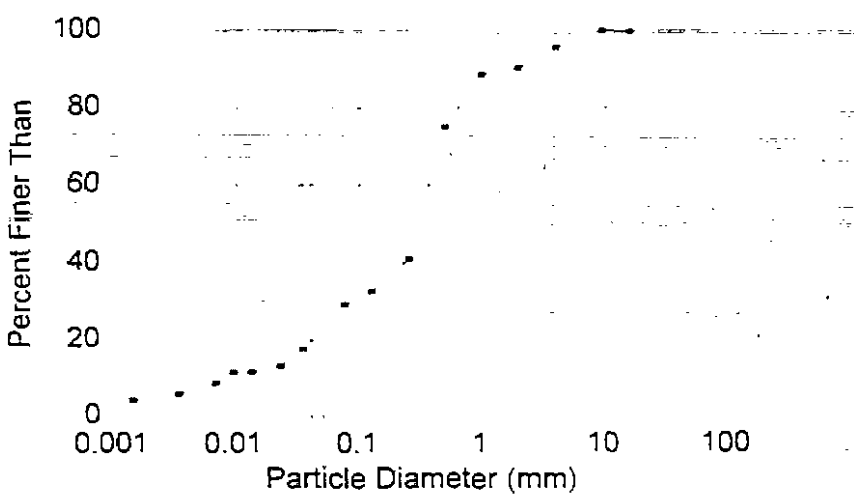
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	0.07	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	6.94	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	8.64	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.014	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.011	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.01	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.01	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.008	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.006	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.005	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	1.75	[redacted]	[redacted]
[redacted]	15.16	[redacted]	[redacted]
[redacted]	37.20	[redacted]	[redacted]
[redacted]	9.23	[redacted]	[redacted]
[redacted]	3.69	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	99.9
Course Sand	[redacted]	95.7
	[redacted]	90.5
Medium Sand	[redacted]	88.8
	[redacted]	75.0
Fine Sand	[redacted]	41.1
	[redacted]	32.7
	[redacted]	29.4
Silt	0.0350	17.5
	0.0228	13.
	0.0133	11.
	0.0094	11.
	0.0068	8.
Clay	0.0034	5.
	0.0014	4.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name: Brian Holderness
Date: 06/20/97

Site name: AVTEX
Sample No.: 404

Sample Data

Mass of sample split on No. 10 sieve (g):	270.87
Mass retained on No. 10 sieve (g):	75.82
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.76
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.76

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	99.42

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01365
W:	[illegible]
F:	[illegible]

[redacted]

[redacted]	404

Sieve Analysis

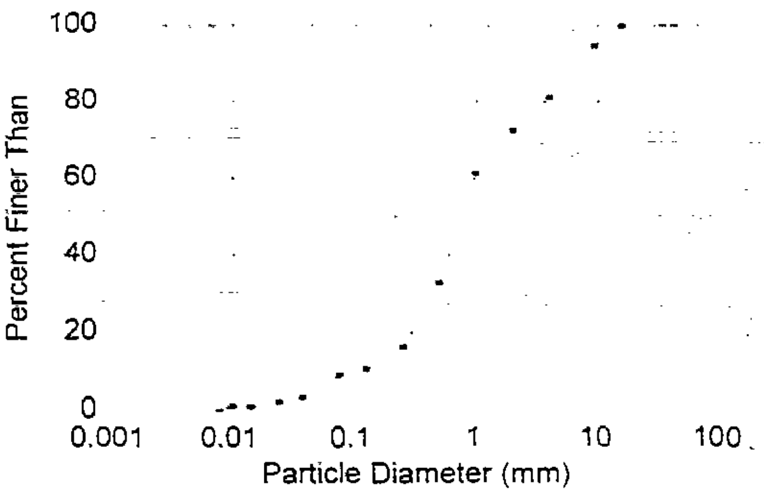
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	15.12	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	36.28	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	24.42	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.006	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.005	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.004	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.004	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.003	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.003	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.003	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	14.88	[redacted]	[redacted]
[redacted]	39.25	[redacted]	[redacted]
[redacted]	22.79	[redacted]	[redacted]
[redacted]	7.73	[redacted]	[redacted]
[redacted]	2.36	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	94.4
Course Sand	[redacted]	81.2
	[redacted]	72.3
Medium Sand	[redacted]	61.2
	[redacted]	32.8
Fine Sand	[redacted]	16.2
	[redacted]	10.
	[redacted]	8.
Silt	0.0380	3.
	0.0242	2.
	0.0141	1.
	0.0100	1.
	0.0071	-0.
Clay	0.0035	-0
	0.0015	-0

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	502

Sample Data

Mass of sample split on No. 10 sieve (g):	192.39
Mass retained on No. 10 sieve (g):	83.58
Mass passing No. 10 sieve (g):	[redacted]
Percent passing No. 10 sieve (g):	[redacted]
Mass used in Hydrometer test (g):	100.56
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	[redacted]

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[redacted]
Corrected mass of soil used in hydrometer test (g):	[redacted]

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	[redacted]

Values

K:	0.01365
W:	[redacted]
F:	[redacted]

[redacted]

[redacted]	502

Sieve Analysis

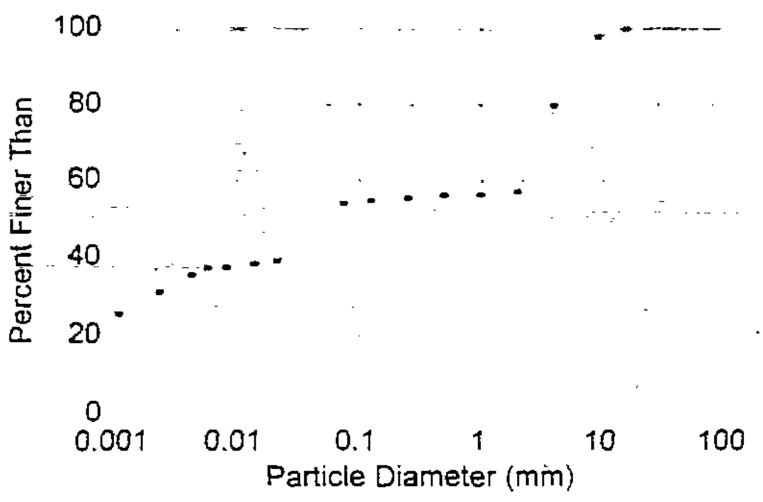
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	3.80	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	35.78	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	44.00	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.046	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.045	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.044	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.044	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.042	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.037	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.031	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.09	[redacted]	[redacted]
[redacted]	0.39	[redacted]	[redacted]
[redacted]	1.12	[redacted]	[redacted]
[redacted]	1.58	[redacted]	[redacted]
[redacted]	0.99	[redacted]	[redacted]
TOTAL [redacted]			



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	98.0
Course Sand	[redacted]	79.7
	[redacted]	57.1
Medium Sand	[redacted]	56.5
	[redacted]	56.2
Fine Sand	[redacted]	55.6
	[redacted]	54.7
	[redacted]	54.1
Silt	0.0214	39.3
	0.0139	38.4
	0.0082	37.5
	0.0058	37.5
	0.0043	35.
Clay	0.0023	31.
	0.0011	25.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	506

Sample Data

Mass of sample split on No. 10 sieve (g):	127.29
Mass retained on No. 10 sieve (g):	22.49
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.32
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	98.98

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	[illegible]

Values

K:	0.01365
W:	[illegible]
F:	[illegible]

[redacted]

[redacted]	506

Sieve Analysis

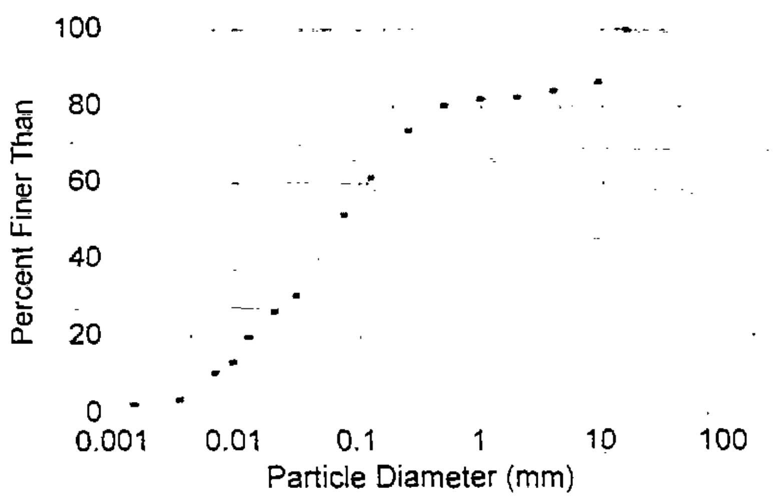
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	17.50	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	2.80	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	2.19	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.026	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.023	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.018	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.013	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.011	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.006	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.005	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.25	[redacted]	[redacted]
[redacted]	1.91	[redacted]	[redacted]
[redacted]	8.11	[redacted]	[redacted]
[redacted]	14.72	[redacted]	[redacted]
[redacted]	11.64	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	86.4
Course Sand	[redacted]	84.2
	[redacted]	82.5
Medium Sand	[redacted]	82.1
	[redacted]	80.5
Fine Sand	[redacted]	73.7
	[redacted]	61.
	[redacted]	51.
Silt	0.0308	30.
	0.0203	26.
	0.0124	20.
	0.0092	13.
	0.0066	10.
Clay	0.0034	4.
	0.0014	2.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name: Brian Holderness
Date: 06/20/97

Site name: AVTEX
Sample No.: 501

Sample Data

Mass of sample split on No. 10 sieve (g):	346.45
Mass retained on No. 10 sieve (g):	205.43
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.13
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	[illegible]13

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hydrometer Test

Hydrometer type:	[illegible]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01365
W:	242.71
F:	143.92

[redacted]	501

Sieve Analysis

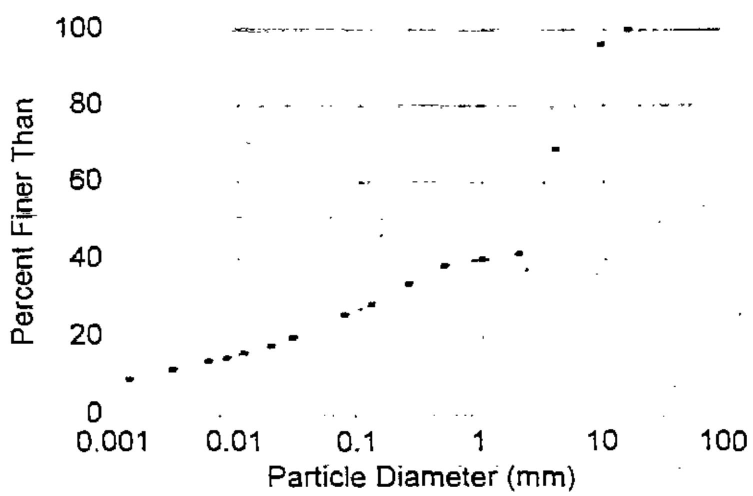
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	13.34	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	96.66	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	95.43	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.033	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.03	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.027	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.025	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.024	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.021	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.017	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	1.30	[redacted]	[redacted]
[redacted]	3.81	[redacted]	[redacted]
[redacted]	11.77	[redacted]	[redacted]
[redacted]	12.70	[redacted]	[redacted]
[redacted]	6.44	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	96.2
Course Sand	[redacted]	68.6
	[redacted]	41.4
Medium Sand	[redacted]	40.1
	[redacted]	38.6
Fine Sand	[redacted]	33.7
	[redacted]	28.5
	[redacted]	25.8
Silt	0.0279	19.8
	0.0185	17.8
	0.0111	15.8
	0.0081	14.5
	0.0058	13.
Clay	0.0029	11.
	0.0013	9.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	44

Sample Split

Mass of sample split on No. 10 sieve (g):	103.11
Mass retained on No. 10 sieve (g):	29.63
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	70.46
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	70.46

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	69.52

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01365
W:	97.55
F:	28.03

[redacted]

AR300817

[redacted]	44

Sieve Analysis

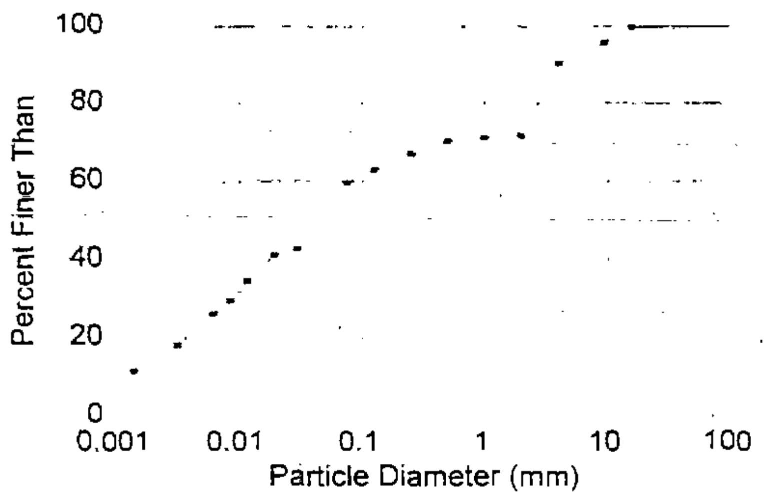
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	4.50	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	5.53	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	19.60	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.029	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.028	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.024	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.021	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.019	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.014	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.01	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.11	[redacted]	[redacted]
[redacted]	0.78	[redacted]	[redacted]
[redacted]	3.15	[redacted]	[redacted]
[redacted]	4.04	[redacted]	[redacted]
[redacted]	3.20	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	95.6
Course Sand	[redacted]	90.4
	[redacted]	71.6
Medium Sand	[redacted]	71.1
	[redacted]	70.3
Fine Sand	[redacted]	67.1
	[redacted]	62.
	[redacted]	59.
Silt	0.0296	42.
	0.0190	41.
	0.0116	34.
	0.0085	29.
	0.0061	26.
Clay	0.0032	18.
	0.0014	11.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	503

Sample Data

Mass of sample split on No. 10 sieve (g):	184.65
Mass retained on No. 10 sieve (g):	42.41
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.54
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.54

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	99.20

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01365
W:	128.78
F:	29.58

[redacted]

[redacted]	503

Sieve Analysis

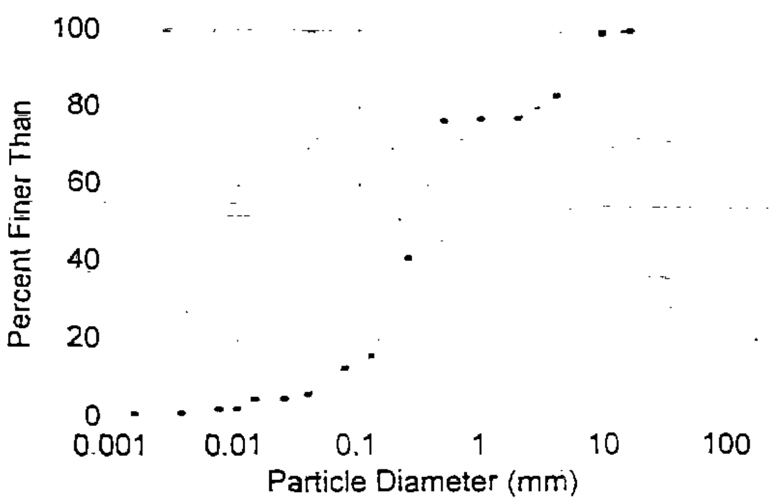
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.68	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	29.99	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	10.74	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.008	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.007	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.007	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.005	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.005	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.004	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.004	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.04	[redacted]	[redacted]
[redacted]	0.53	[redacted]	[redacted]
[redacted]	45.61	[redacted]	[redacted]
[redacted]	32.52	[redacted]	[redacted]
[redacted]	3.96	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percen Finer
Fine Gravel	[redacted]	100.
	[redacted]	99.
Course Sand	[redacted]	83.0
	[redacted]	77.3
Medium Sand	[redacted]	77.0
	[redacted]	76.5
Fine Sand	[redacted]	41.
	[redacted]	15.
	[redacted]	12.
Silt	0.0373	6.
	0.0238	4.
	0.0138	4.
	0.0099	2
	0.0070	2
Clay	0.0035	1
	0.0014	1

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	45

Sample Data

Mass of sample split on No. 10 sieve (g):	148.92
Mass retained on No. 10 sieve (g):	26.81
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.32
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	98.98

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01365
W:	[illegible]
F:	21.73

[redacted]

AR300821

[redacted]	45

Sieve Analysis

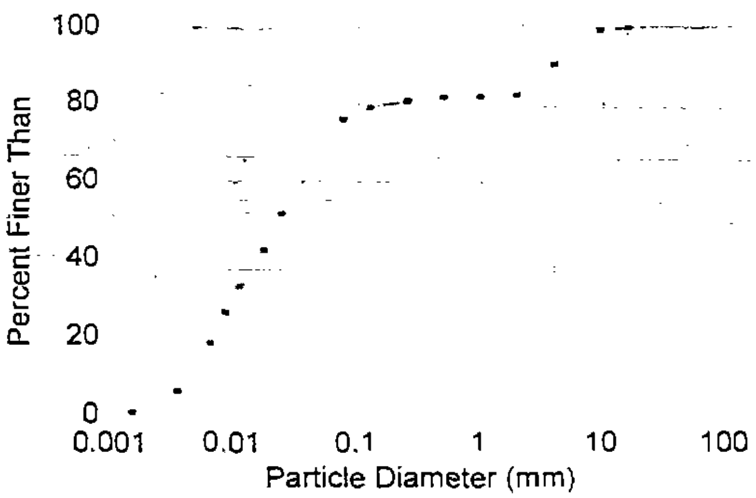
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	0.87	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	13.86	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	12.08	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.042	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.035	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.028	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.023	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.017	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.008	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.004	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.04	[redacted]	[redacted]
[redacted]	0.36	[redacted]	[redacted]
[redacted]	0.95	[redacted]	[redacted]
[redacted]	2.23	[redacted]	[redacted]
[redacted]	3.57	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	99.4
Course Sand	[redacted]	90.2
	[redacted]	82.2
Medium Sand	[redacted]	81.9
	[redacted]	81.6
Fine Sand	[redacted]	80.8
	[redacted]	79.0
	[redacted]	76.0
Silt	0.0236	51.8
	0.0171	42.5
	0.0110	33.2
	0.0083	26.6
	0.0063	18.6
Clay	0.0033	6.6
	0.0014	1.3

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	505

Sample Data

Mass of sample split on No. 10 sieve (g):	325.34
Mass retained on No. 10 sieve (g):	185.48
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.48
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.48

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hydrometer Test

Hydrometer type:	[illegible]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01365
W:	230.62
F:	[illegible]

[redacted]

[redacted]	505

Sieve Analysis

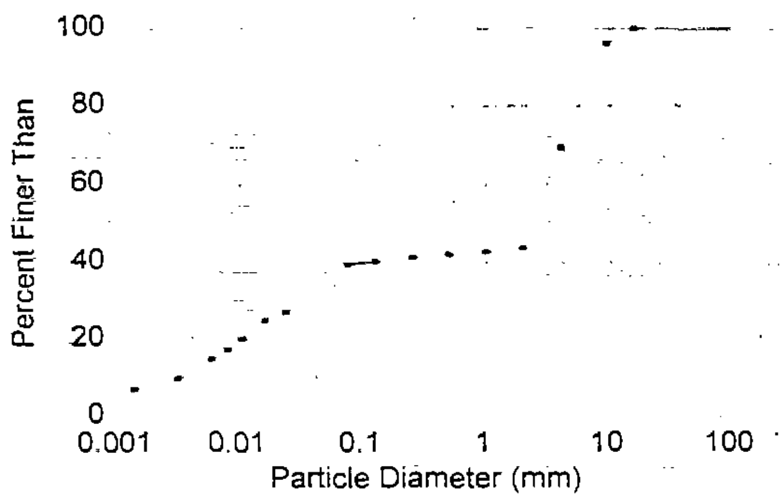
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	12.38	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	88.95	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	84.15	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.042	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.039	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.032	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.028	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.024	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.017	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.013	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.56	[redacted]	[redacted]
[redacted]	1.41	[redacted]	[redacted]
[redacted]	2.06	[redacted]	[redacted]
[redacted]	2.11	[redacted]	[redacted]
[redacted]	1.90	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	96.2
Course Sand	[redacted]	69.2
	[redacted]	43.7
Medium Sand	[redacted]	42.7
	[redacted]	42.
Fine Sand	[redacted]	41.2
	[redacted]	40.
	[redacted]	39.
Silt	0.0236	27.
	0.0159	25.
	0.0103	20.
	0.0078	17.
	0.0058	14.
Clay	0.0031	9.
	0.0013	6

[redacted]

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-036

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022
05 1997

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #: NA
Lab: REAC Engineering Lab
Contact: Mark Huston
(908) 321-4285

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
357	I	11-215-00401	Reference	Sediment	5/13/97	32 oz glass/wet ice, 4C	Grain Size		
358	I	11-215-00402	BMI-2	Sediment	5/13/97	32 oz glass/wet ice, 4C	Grain Size		
359	I	11-215-00403	BMI-3	Sediment	5/13/97	32 oz glass/wet ice, 4C	Grain Size		
360	I	11-215-00404	BMI-4	Sediment	5/13/97	32 oz glass/wet ice, 4C	Grain Size		
361	I	11-215-00405	BMI-5	Sediment	5/13/97	32 oz glass/wet ice, 4C	Grain Size		
362	I	11-215-00406	BMI-6	Sediment	5/13/97	32 oz glass/wet ice, 4C	Grain Size		
363	I	11-215-00407	BMI-1	Sediment	5/13/97	32 oz glass/wet ice, 4C	Grain Size		
364	I	11-215-00410	Reference No. 2	Sediment	5/15/97	32 oz glass/wet ice, 4C	Grain Size		
365	F	11-215-00501	Reference	Soil	5/15/97	32 oz glass/wet ice, 4C	Grain Size		
366	F	11-215-00502	Wetland Area	Soil	5/15/97	32 oz glass/wet ice, 4C	Grain Size		
367	F	11-215-00503	Emergency Pond	Soil	5/15/97	32 oz glass/wet ice, 4C	Grain Size		
368	F	11-215-00504	PCB Area	Soil	5/15/97	32 oz glass/wet ice, 4C	Grain Size		
369	F	11-215-00505	Treatment Plant	Soil	5/15/97	32 oz glass/wet ice, 4C	Grain Size		
370	F	11-215-00506	Fly Ash Pile	Soil	5/15/97	32 oz glass/wet ice, 4C	Grain Size		
371	I	11-215-00605	Sulfate Basin No. 1	Sediment	5/14/97	32 oz glass/wet ice, 4C	Grain Size		
372	I	11-215-00606	Emergency Pond	Sediment	5/14/97	32 oz glass/wet ice, 4C	Grain Size		
373	I	11-215-00607	Polishing Pond	Sediment	5/14/97	32 oz glass/wet ice, 4C	Grain Size		
374	I	11-215-00608	Viscose Creek	Sediment	5/14/97	32 oz glass/wet ice, 4C	Grain Size		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all / analyses	Mark Huston	5/16/97	B. Lewis	5/19/97	0845	All / Grain Size	B Lewis	5/19/97	[illegible]	21 May 97	0835

AR300825

REAC, Edison, [redacted]
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: [redacted] Fibers Site
Location: [redacted] Royal, Va
Site Phone:

Page No. [redacted] of 2
[redacted]er #:2342
Lab: REAC
Contact: Mark Huston
(908) 321-4285

051497

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
920	B	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
↓	C	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	8 oz glass/wet ice, 4C	metals, TAL		[redacted]
	J	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	32 oz glass/wet ice, 4C	Grain Size		
921	B	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	8 oz glass/wet ice, 4C	Pesticides/PCB		
	C	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	8 oz glass/wet ice, 4C	metals, TAL		
↓	J	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	32 oz glass/wet ice, 4C	Grain Size		
922	A	11-215-00046	Sulfate Basin No. 5	Water	5/12/97	1 L poly/4C	metals, TAL		
↓	B	11-215-00046	Sulfate Basin No. 5	Water	5/12/97	1 L Amber/4C	Pesticides/PCB		
923	A	11-215-00047	Fly Ash Basin No. 4	Water	5/12/97	1 L poly/4C	metals, TAL		
↓	B	11-215-00047	Fly Ash Basin No. 4	Water	5/12/97	1 L Amber/4C	Pesticides/PCB		
924	A	11-215-00060	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
925	A	11-215-00061	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
926	A	11-215-00062	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
927	A	11-215-00063	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
928	A	11-215-00064	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
929	A	11-215-00065	Sulfate Basin No. 5	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST	Y	
930	A	11-215-00070	Outfall 001	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST	Y	
931	A	11-215-00071	Outfall 001	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
932	A	11-215-00072	Outfall 001	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		
933	A	11-215-00073	Outfall 001	* WHOLE BODY	5/13/97	Foil/4 C	TAL/PCB/PEST		

Special Instructions: Peer review (PK)

MS/MSD on 215-065
215-070

Note * Fish Tissue

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
1-20/Analysis	Mark Huston	5/13/97	B Lewan	5/14/97	10:30	All/Analysis	B Lewan	5/14/97	[illegible]	5/14/97	10:40
All Analyses	[illegible]	5/15/97	B Lewan	5/15/97		41 Pest/PCB	B Lewan	5/14/97	[illegible]	5/14/97	2:50 pm
41 Metals	B Lewan	5/15/97	Colleen Egan	5/15/97	4:30	41 Metals	B Lewan	5/14/97	Colleen Egan	5/14/97	2:00pm
2/Grain Size	B Lewan	5/21/97	[illegible]	5/21/97	0835						

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	606

Sample Data

Mass of sample split on No. 10 sieve (g):	136.74
Mass retained on No. 10 sieve (g):	20.14
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.6
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hydrometer Test

Hydrometer type:	[illegible]
Hydrometer correction:	0.002
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	[illegible]

Values

K:	0.01365
W:	[illegible]
F:	[illegible]

[redacted]	606

Sieve Analysis

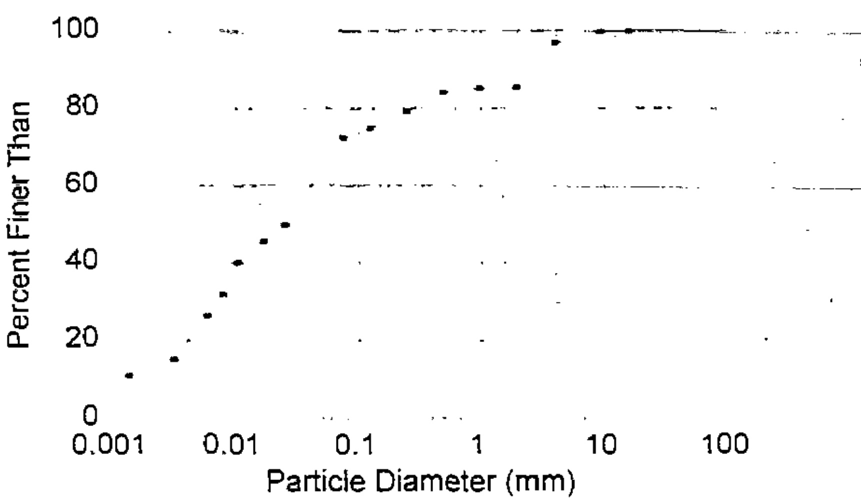
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	0.20	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	4.08	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	15.86	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.038	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.035	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.031	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.025	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.021	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.013	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.01	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]
[redacted]	1.43	[redacted]	[redacted]
[redacted]	5.49	[redacted]	[redacted]
[redacted]	5.30	[redacted]	[redacted]
[redacted]	2.86	[redacted]	[redacted]
TOTAL [redacted]			



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	99.8
Course Sand	[redacted]	96.9
	[redacted]	85.4
Medium Sand	[redacted]	85.2
	[redacted]	84.0
Fine Sand	[redacted]	79.3
	[redacted]	74.7
	[redacted]	72.3
Silt	0.0251	49.6
	0.0168	45.5
	0.0103	40.0
	0.0080	31.7
	0.0059	26.2
Clay	0.0032	15.
	0.0014	11.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	405

Sample Data

Mass of sample split on No. 10 sieve (g):	145.87
Mass retained on No. 10 sieve (g):	6.99
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.43
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.43

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	99.09

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01355
W:	[illegible]
F:	[illegible]

[redacted]

[redacted]	405

Sieve Analysis

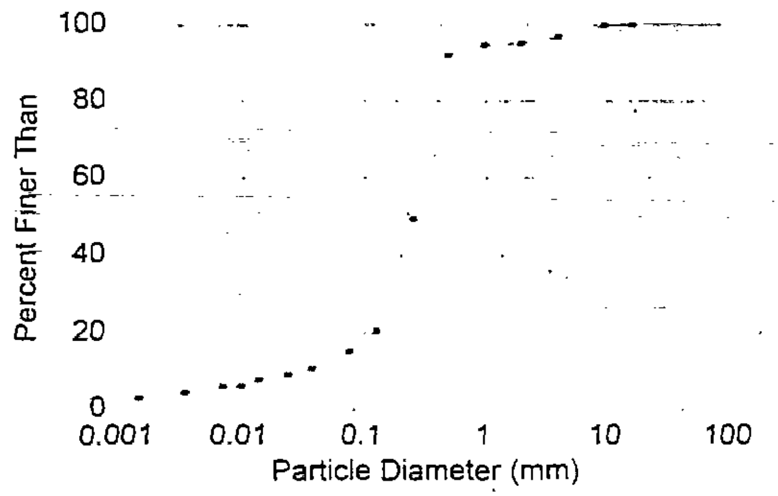
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	4.64	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	2.35	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.01	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.009	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.008	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.007	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.007	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.006	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.005	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.23	[redacted]	[redacted]
[redacted]	3.03	[redacted]	[redacted]
[redacted]	44.34	[redacted]	[redacted]
[redacted]	29.83	[redacted]	[redacted]
0.075	5.70	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	100.0
Course Sand	[redacted]	96.8
	[redacted]	95.2
Medium Sand	[redacted]	94.9
	[redacted]	92.0
Fine Sand	[redacted]	49.4
	[redacted]	20.8
	[redacted]	15.
Silt	0.0367	10.
	0.0234	9.
	0.0136	7.
	0.0097	6.
	0.0069	6.
Clay	0.0034	4.
	0.0014	3

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	402

Sample [illegible]

Mass of sample split on No. 10 sieve (g):	149.42
Mass retained on No. 10 sieve (g):	7.1
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.27
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.27

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	98.93

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01365
W:	[illegible]
F:	[illegible]

[redacted]

Result	402

Sieve Analysis

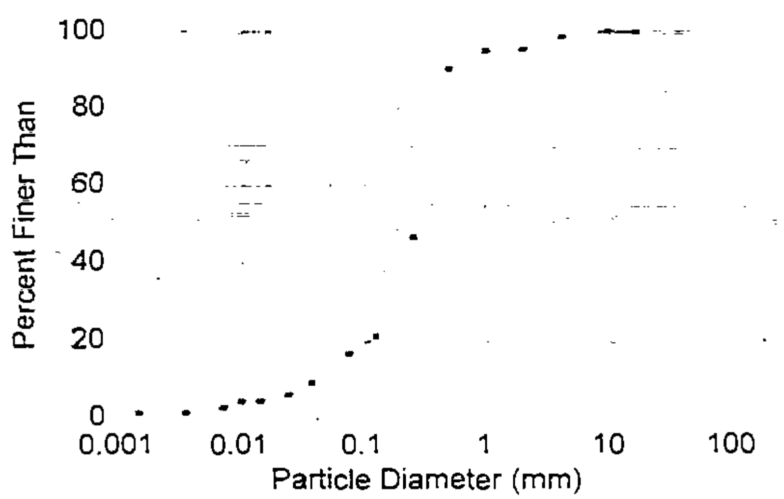
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[illegible]	0.00	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	0.00	[illegible]	[illegible]	[illegible]	100.00
[illegible]	2.11	[illegible]	[illegible]	[illegible]	98.61
[illegible]	4.99	[illegible]	[illegible]	[illegible]	[illegible]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
2	1.009	[illegible]	[illegible]	[illegible]	9.28
5	1.007	[illegible]	[illegible]	[illegible]	6.18
15	1.006	[illegible]	[illegible]	[illegible]	4.64
30	1.006	[illegible]	[illegible]	0.0098	4.64
[illegible]	1.005	[illegible]	[illegible]	0.0070	3.09
250	1.004	[illegible]	16.03	0.0035	1.55
1440	1.004	[illegible]	16.03	0.0014	1.55

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[illegible]	0.03	98.90	95.22
0.5	5.20	93.70	90.21
0.25	45.44	48.26	46.47
0.125	26.19	[illegible]	21.25
0.075	4.52	17.55	16.90
TOTAL	81.38		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[illegible]	100.0
	[illegible]	100.0
Course Sand	[illegible]	98.6
	[illegible]	95.3
Medium Sand	[illegible]	95.2
	0.5	90.2
Fine Sand	0.25	46.4
	0.125	21.
	0.075	16.
Silt	0.0370	9.
	0.0238	6.
	0.0139	4.
	0.0098	4.
	0.0070	3.
Clay	0.0035	1.
	0.0014	1.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	607

Sample Data

Mass of sample split on No. 10 sieve (g):	192.74
Mass retained on No. 10 sieve (g):	88
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.27
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.27

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	98.83

Hydrometer Test

Hydrometer type:	[redacted]
Hydrometer correction:	0.003
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.003

Values

K:	0.01355
W:	[illegible]
F:	[illegible]

[redacted]

[redacted]	607

Sieve Analysis

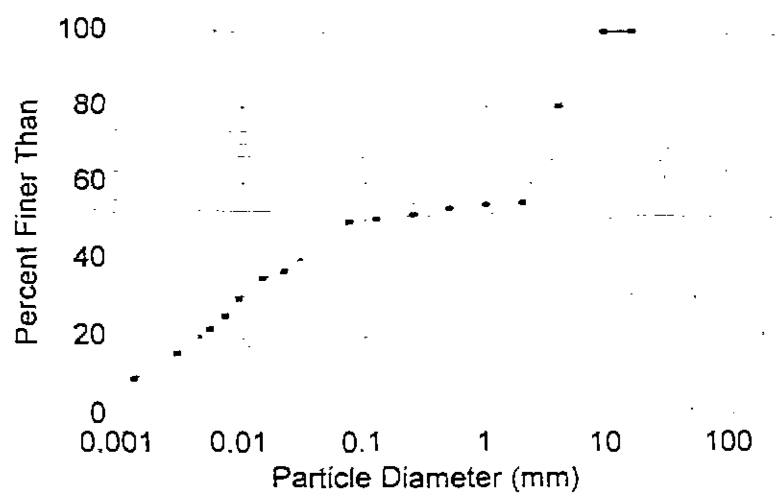
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	38.50	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	49.50	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.045	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.043	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.037	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.032	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.028	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.021	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.014	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.05	[redacted]	[redacted]
[redacted]	1.63	[redacted]	[redacted]
[redacted]	2.86	[redacted]	[redacted]
[redacted]	2.37	[redacted]	[redacted]
[redacted]	1.32	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	100.0
Course Sand	[redacted]	80.2
	[redacted]	54.9
Medium Sand	[redacted]	54.3
	[redacted]	53.4
Fine Sand	[redacted]	51.8
	[redacted]	50.5
	[redacted]	49.8
Silt	0.0220	37.
	0.0146	35.
	0.0095	29.
	0.0073	25.
	0.0055	22.
Clay	0.0029	15.
	0.0013	9.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	608

Sample Data

Mass of sample split on No. 10 sieve (g):	150.46
Mass retained on No. 10 sieve (g):	51.51
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.25
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	100.25

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hydrometer Test

Hydrometer type:	[illegible]
Hydrometer correction:	0.002
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.002

Values

K:	0.01365
W:	150.40
F:	51.49

[redacted]

[redacted]	608

Sieve Analysis

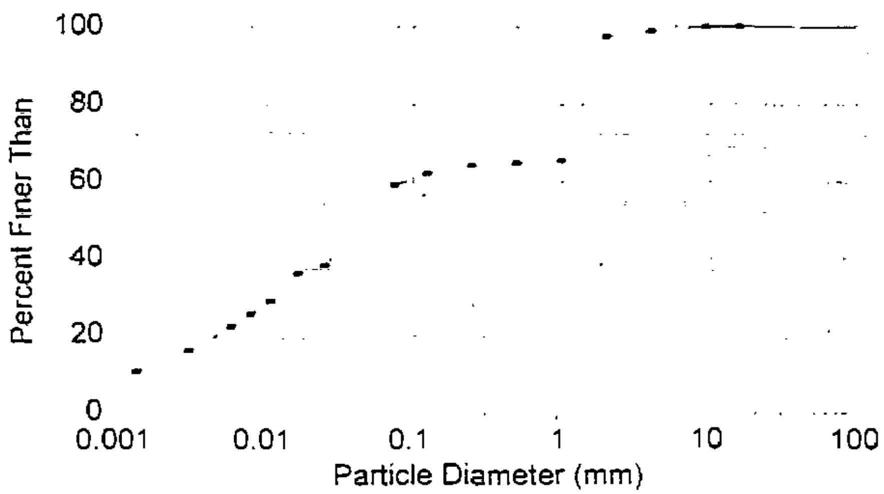
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	0.96	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	22.66	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	27.89	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.038	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.036	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.029	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.026	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.023	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.017	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.012	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.26	[redacted]	[redacted]
[redacted]	0.83	[redacted]	[redacted]
[redacted]	1.05	[redacted]	[redacted]
[redacted]	3.13	[redacted]	[redacted]
0.075	4.40	[redacted]	[redacted]
TOTAL [redacted]			



ASTM Grain Size	Particle Dia. (mm)	Percent Finer
Fine Gravel	[redacted]	100.0
	[redacted]	99.9
Course Sand	[redacted]	98.9
	[redacted]	97.6
Medium Sand	[redacted]	65.5
	[redacted]	65.0
Fine Sand	[redacted]	64.3
	[redacted]	62.2
	[redacted]	59.3
Silt	0.0251	38.4
	0.0165	36.3
	0.0107	28.8
	0.0079	25.6
	0.0058	22.4
Clay	0.0030	16.
	0.0013	10.

[redacted]

PARTICLE SIZE ANALYSIS

Technician's name:	Brian Holderness
Date:	06/20/97
Site name:	AVTEX
Sample No.:	406

Sample Data

Mass of sample split on No. 10 sieve (g):	148.99
Mass retained on No. 10 sieve (g):	4.83
Mass passing No. 10 sieve (g):	[illegible]
Percent passing No. 10 sieve (g):	[illegible]
Mass used in Hydrometer test (g):	100.85
Specific gravity of soil:	2.65
Correction factor:	1
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g):	15
Oven-dry mass of test sample (g):	14.8
Percent hygroscopic moisture:	[illegible]
Corrected mass of soil used in hydrometer test (g):	[illegible]

Hydrometer Test

Hydrometer type:	[illegible]
Hydrometer correction:	0.002
Average temperature (C):	20
Temperature correction factor:	0
Total Hydrometer correction:	0.002

Values

K:	0.01365
W:	[illegible]
F:	[illegible]

[redacted]	406

Sieve Analysis

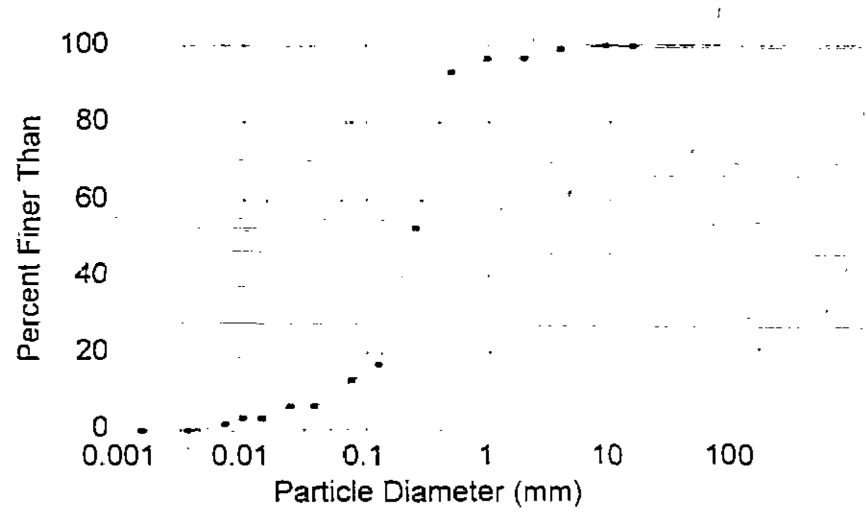
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	0.00	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.43	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	3.43	[redacted]	[redacted]	[redacted]	[redacted]

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
[redacted]	1.006	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.006	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.004	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.004	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.003	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.002	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	1.002	[redacted]	[redacted]	[redacted]	[redacted]

Sieve Analysis <No.10

Size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
[redacted]	0.20	[redacted]	[redacted]
[redacted]	3.64	[redacted]	[redacted]
[redacted]	41.30	[redacted]	[redacted]
[redacted]	36.82	[redacted]	[redacted]
[redacted]	4.40	[redacted]	[redacted]
TOTAL	[redacted]		



ASTM Grain Size	Particle Dia. (mm)	Percen Finer
Fine Gravel	[redacted]	100.(
	[redacted]	100.(
Course Sand	[redacted]	99.C
	[redacted]	96.7
Medium Sand	[redacted]	96.5
	[redacted]	93.C
Fine Sand	[redacted]	52.8
	[redacted]	17.
	[redacted]	12.
Silt	0.0377	6.
	0.0238	6.
	0.0140	3.
	0.0099	3.
	0.0071	1
Clay	0.0035	0
	0.0015	0

[redacted]

APPENDIX F
Toxicity Test Reports
Avtex Fibers Site
Front Royal, VA
February 1999

QST
ENVIRONMENTAL

September 5, 1997

Mr. Mark Huston
Roy F. Weston, Inc.
GSA Raritan Depot
Building 209, Annex (Bay F)
2890 Woodbridge Avenue
Edison, NJ 08837-3679

RE: Toxicity Analysis of Sediment and Surface Water Samples from the Avtex Fibers Superfund Site, Front Royal, Virginia: Project No. 3347-041-001-1215

Dear Mark:

Please find enclosed, the final reports for the above-referenced toxicity tests conducted by QST Environmental. The reports incortporate all of your changes. However, if you should require additional changes, I will be happy to make them for you. It was my pleasure working with you on this project. I hope we have the opportunity to work together again in the future.

Please call me at (352) 333-2626 if you have any questions.

Sincerely,
QST ENVIRONMENTAL INC.

Joe Owusu-Yaw

Joe Owusu-Yaw, Ph.D.
Toxicology Lab Manager

Enclosures:

[redacted]

FINAL REPORT:

CHRONIC TOXICITY OF SURFACE WATER SAMPLES FROM THE AVTEX FIBERS SUPERFUND SITE, FRONT ROYAL, VIRGINIA, WITH *Pimephales promelas* and *Ceriodaphnia dubia*

PREPARED FOR:

Roy F. Weston Inc.
GSA Raritan Depot
Building 209 Annex (Bay F)
2890 Woodbridge Avenue
Edison, NJ 08837-3679
Phone: (908) 321-4200
Fax: (908) 321-4021

PREPARED BY:

QST Environmental, Inc.
404 SW 140th Terrace
Newberry, Florida 32669-3000
Phone: (352) 332-3318
Fax: (352) 333-6622

STUDY ID:

Roy F. Weston No. 3347-041-001-1215
QST No. 3197225-0100-3100

September 1997

[redacted]

EXECUTIVE SUMMARY

Short-term chronic toxicity tests were conducted at QST Environmental Inc. (formerly Environmental Science & Engineering, Inc.) with the cladoceran, *Ceriodaphnia dubia*, and the fathead minnow, *Pimephales promelas,* on surface water samples collected from the Avtex Fibers Superfund Site, Front Royal, Virginia. The effect criteria were survival and reproductive success for *Ceriodaphnia dubia*, and survival and growth for *Pimephales promelas*. A total of 5 site surface water samples and one laboratory control sample were used in the chronic toxicity tests. After 6 days of exposure, there were no significant differences (P=0.05) in survival and neonate production of *Ceriodaphnia dubia* between the laboratory control water and any of the surface water samples collected from the Avtex Superfund Site. The chronic no-observed-effect concentration (NOEC) values for *Ceriodaphnia dubia* survival and reproduction were 100 percent for all of the surface water samples. After 7 days of exposure, survival of *Pimephales promelas* in the laboratory control water was significantly different (P=0.05) from survival of *Pimephales promelas* in surface water from sample stations 11-215-00047 (Fly Ash Basin No. 4) and 11-215-00603 (Polishing Pond). There were no significant differences (P=0.05) in the growth of *Pimephales promelas* between the laboratory control water and any of the surface water samples collected from the Avtex Superfund Site. The chronic no-observed-effect concentration (NOEC) values for *Pimephales promelas* survival were 100 percent water for samples from sample stations 11-215-00046, 11-215-00601, and 11-215-00602. The NOEC values were 50 percent and less than 50 percent site water, respectively, for samples from sample stations 11-215-00047 and 11-215-00603. The NOEC values for *Pimephales promelas* growth were 100 percent for all of the surface water samples.

TABLE OF CONTENTS

[redacted]

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

QST Environmental Inc. (formerly Environmental Science & Engineering, Inc.) conducted short-term chronic toxicity tests with surface water samples from the Avtex Fibers Superfund Site, Front Royal, Virginia. The tests were conducted from May 21 through 28, 1997, using the cladoceran, *Ceriodaphnia dubia* and the fathead minnow, *Pimephales promelas*. The criteria for effect were survival and reproductive success for *Ceriodaphnia dubia* and survival and growth (measured as dry weight) for *Pimephales promelas*. All of the original raw data pertaining to the chronic toxicity tests are maintained at QST Environmental Inc. 404 SW 140th Terrace, Newberry, Florida 32669-3000.

2.0 MATERIALS AND METHODS

2.1 TEST SAMPLES

Five grab samples of surface water were collected by Roy F. Weston, Inc. personnel and shipped to QST on ice at 4 $\pm$ 2 °C. The samples, identified as 11-215-00601, 11-215-00602, 11-215-00603, 11-215-00046, and 11-215-00047, were collected from Sulfate Basin No. 1, Emergency Pond, Polishing Pond, Sulfate Basin No. 5 and Fly Ash Basin No. 4, respectively. All of the samples were received on May 1 1997 and were stored in a refrigerator at 4 $\pm$ 2 °C during the testing period. Prior to use in the chronic tests, samples were allowed to equilibrate to test temperature. The toxicity tests were initiated on May 21, 1997, within 4 days of sample receipt. Sample chain-of-custody and other traffic information are provided in Appendix A.

2.2 TEST ORGANISMS

Neonate *C. dubia*, less than 24 hours old at test initiation, were collected from QST in-house cultures and were all released from gravid adults within an 8-hour period. *Pimephales promelas* were obtained from Florida Bioassay Supply, Gainesville, Florida, and were less than 24 hours old at test initiation. All the test organisms appeared to be in normal condition prior to testing. The organisms were acclimated to dilution water and test temperature prior to testing.

2.3 CONTROL WATER

Control water used for holding and sample dilutions for the *C. dubia* tests was reconstituted freshwater

[redacted]

consisting of 20 percent Perrier and 80 percent Milli-Q water with a hardness of 75 mg/L as $CaCO_3$. Control water used for holding and sample dilutions for the *P. promelas* tests was moderately hard reconstituted freshwater with a hardness of 79 mg/L as $CaCO_3$.

2.4 TEST METHODS

All tests were performed according to the guidelines provided in "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms," EPA/600/4-91/002 (EPA 1994).

The *C. dubia* tests were conducted in 30 mL plastic cups containing 15 mL of site or control water. One organism was tested per replicate and ten replicates were tested for each concentration. *C. dubia* were fed 0.1 mL YTC (yeast/trout chow/cereal leaves) and 0.1 mL green algae (*Selenastrum capricornutum*) solution per replicate, daily during the testing period. The *P. promelas* tests were conducted in 340 mL crystallizing glass dishes containing 250 mL of site or control water. Fifteen *P. promelas* were tested per replicate, and three replicates were tested per concentration. *P. promelas* were fed 0.15 mL of brine shrimp nauplii (*Artemia salina*) per replicate twice daily.

The *C. dubia* tests were conducted from May 21 through 27, 1997 and the *P. promelas* tests were conducted from May 21 through 28, 1997. The concentrations of surface water selected for the chronic toxicity tests were 0 (dilution water control) 50, and 100 percent site water. All tests were renewed daily during the test. During each renewal, *C. dubia* were transferred into newly prepared test or control solutions and approximately 75 percent of the *P. promelas* test or control solutions were renewed with freshly prepared test solutions. Tests were conducted at a temperature of 25 $\pm$ 1°C under fluorescent lighting (ambient laboratory illumination) with a daily photoperiod of 16 hours light (855 Lux) and 8 hours darkness. Test temperature was maintained with the aid of a recirculating waterbath.

The tests were monitored at test initiation and daily thereafter for mortality, temperature, dissolved oxygen, and pH. At the conclusion of the chronic exposure, ammonia concentrations were measured on pooled samples from the 3 replicates of the *P. promelas* tests. Ammonia was measured using an Orion 290A

[redacted]

ammonia meter equipped with an Orion 95-12 ammonia probe.

The number of neonates produced by each *C. dubia* was enumerated and recorded daily and the neonates discarded after the recording. At the conclusion of the tests, the mean dry weights of surviving *P. promelas* were determined by transferring the fish in each replicate into pre-weighed aluminum pans, rinsing with deionized water to remove excess food, and drying the pans and fish at 100 °C for 18 hours. After drying, the pans were allowed to cool in a desiccator at room temperature and then each pan was weighed. The group dry weight of each replicate was then determined by difference.

2.5 REFERENCE TOXICANT TESTS

Reference toxicant tests using potassium chloride (KCl) were conducted to evaluate the sensitivity of the test organisms. The reference toxicant test concentrations used were 0 (control), 40, 80, 160, 320 and 640 mg KCl /L for *C. dubia* and 0 (control), 250, 500, 1,000, 2,000 and 4,000 mg KCl/L for *P. Promelas*. The reference toxicant test exposures and conditions were the same as those of the chronic toxicity tests.

2.6 STATISTICAL ANALYSES

Statistical analyses of the chronic data on survival, reproduction and growth (measured as dry weight) were evaluated using the TOXSTAT computer program (WEST, Inc. and Gulley, 1994). The no-observed-effect concentration (NOEC) values for the reference toxicant and each of the test samples were determined using the TOXSTAT computer program. The NOEC is defined as the highest concentration of reference toxicant or test sample which is not significantly different (P=0.05) from the control for a given endpoint (e.g. survival), under the specified conditions of exposure.

[redacted]

3.0 RESULTS AND DISCUSSION

3.1 CHRONIC TOXICITY TEST

Test conditions remained within acceptable limits for the duration of the chronic toxicity tests. A summary of the water quality measurements is presented in Tables 1 and 2. Dissolved oxygen levels remained above 60 percent saturation and test temperatures remained in the range of 24.1 to 25.5 °C for the duration of the *C. dubia* and *P. promelas* tests (Tables 1 and 2). At the end of the exposure period ammonia concentrations in the *P. promelas* exposures were measured to determine if some of the observed mortality was due to ammonia. Ammonia was detected in only sample, 11-215-00603, above the method reporting limit of 0.05 mg/L as nitrogen (Table 3).

Survival and reproduction data for the *C. dubia* chronic toxicity tests are presented in Table 4. The *C. dubia* tests were terminated after 6 days because more than 60 percent of the surviving females had produced three or more broods. After 6 days of exposure, survival of *C. dubia* in the dilution water control exposure was 100 percent. Survival of *C. dubia* in the site water samples ranged from 90 percent (100% 11-215-00046, 100% 11-215-00602 and 100% 11-21-00603) to 100 percent in the remainder of the samples (Table 4). There were no significant differences (P=0.05) in survival of *C. dubia* between the control water and any of the surface water samples collected from the Avtex Fibers Superfund Site. The mean number of neonates produced per surviving *C. dubia* female after the 6-day exposure period is presented in Table 4. Mean control neonate production was 16.2 young per surviving control adult female which was within acceptable limits (≥ 15 young per surviving control female) for this test. Mean neonate production in surviving female adults in the site water samples ranged from 15.7 young (100% 11-215-00603) to 27.7 young per surviving adult female (50% 11-215-00047). All of the values were within the acceptable control reproduction for this test. There were no significant differences (P=0.05) in neonate production between control water and any of the site water samples. With the exception of site sample 11-215-00603, neonate production in the remainder of the site samples was considerably higher the control (Table 4).

Survival and growth data for the *P. promelas* chronic toxicity tests are presented in Table 5. After 7 days of exposure, survival of *P. promelas* in the dilution water control exposure was 98 percent. Survival of *P. promelas* in the site water samples ranged from 49 percent (50% 11-215-00603) to 100 percent (11-215-

[redacted]

00601). Survival of *P. promelas* in the control water was significantly different (P=0.05) from survival in samples from the following sample stations: 100% 11-215-00603, 50% 11-215-00603 and 100% 11-215-00047 (Table 5). It is not immediately apparent why survival of *P. promelas* in 50% 11-215-00603 was less than survival in 100% 11-215-00603. However, survival in both concentrations was significantly less (P=0.05) than the control survival. Ammonia concentrations were measured to determine if it was the cause of the observed mortality. Ammonia was detected in sample 11-215-00603 which had the highest mortality than the remainder of the samples (Table 3). However, ammonia was ruled out as a causative agent since the measured total ammonia concentrations would not result in enough unionized ammonia to result in the observed mortality. Also, survival of *P. promelas* in sample 11-215-00047 was significantly less (P=0.05) than the control even though there was no ammonia present in this sample above the reporting limit.

Growth of *P. promelas*, measured as mean dry weight, is presented in Table 5. The mean dry weight of surviving *P. promelas* in the controls after 7 days of exposure was 0.44 mg per organism which was within the acceptable limits (≥0.25 mg/organism in the control exposures) for this test. The mean dry weight of *P. promelas* in the site water samples ranged from 0.43 mg per organism (100 and 50% Polishing Pond 11-215-00603) to 0.53 mg per organism (100% Emergency Pond sample 11-215-00602). There were no significant differences (P=0.05) in growth of *P. promelas* between control and any of the site water samples.

Copies of the relevant raw data pertaining to the *C. dubia* and *P. promelas* chronic toxicity tests are provided in Appendices B and C, respectively.

3.2 REFERENCE TOXICANT TEST

The chronic NOEC for *C. dubia* survival and reproduction were determined to be 160 mg KCl/L and 80 mg KCl/L, respectively. The chronic NOEC for *P. promelas* survival and growth were both determined to be 500 mg KCl/L. The reference toxicant results were within control limits of reference toxicant tests performed at QST. The results of the reference toxicant tests demonstrated that both test species were within their expected sensitivity ranges. Copies of the relevant raw data pertaining to the *C. dubia* and *P.*

promelas chronic reference toxicant tests are provided in Appendix D.

4.0 CONCLUSION

Under the conditions of the tests, there were no significant differences (P=0.05) in survival and neonate production of *Ceriodaphnia dubia* between the laboratory control water and any of the surface water samples collected from the Avtex Superfund Site. The chronic no-observed-effect concentration (NOEC) values for *Ceriodaphnia dubia* survival and reproduction were 100 percent for all of the surface water samples. Survival of *Pimephales promelas* in the laboratory control water was significantly different (P=0.05) from survival of *Pimephales promelas* in water samples from sample stations 11-215-00047 (Fly Ash Basin No. 4) and 11-215-00603 (Polishing Pond). There were no significant differences (P=0.05) in the growth of *Pimephales promelas* between the laboratory control water and any of the surface water samples collected from the Avtex Superfund Site. The chronic no-observed-effect concentration (NOEC) values for *Pimephales promelas* survival were 100 percent water for samples from sample stations 11-215-00046, 11-215-00601, and 11-215-00602. The NOEC values were 50 percent, and less than 50 percent water, respectively, for surface water from sample stations 11-215-00047 and 11-215-00603. The NOEC values for *Pimephales promelas* growth were 100 percent for all of the surface water samples.

5.0 REFERENCES

1. United States Environmental Protection Agency. 1994. *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, 4th Edition, EPA/600/4-91/002. Environmental Monitoring and Support Laboratory. Cincinnati, Ohio. April 1994.

2. WEST, Inc. and Gulley, D. 1994. TOXSTAT. Version 3.4. Copyright License Granted to WEST, Inc. 1402 S. Greeley HWY, Cheyenne, WY 82007.

[redacted]

Table 1 Water Quality Measurement Ranges[a] During Chronic Toxicity Tests with *Ceriodaphnia dubia* on Surface Water Samples Collected from the Avtex Fibers Superfund Site, Front Royal, Virginia

Sample ID	Location	Temperature °C	DO (mg/L)[b]	pH (s.u.)[c]	Conductivity (μmhos/cm)[d]
Control	NA	24.2-25.1	7.9-8.6	7.7-8.0	170
11-215-00601	Sulfate Basin No. 1	24.1-25.4	7.8-8.7	7.9-8.4	980-1,700
11-215-00602	Emergency Pond	24.3-25.5	7.8-8.9	7.8-8.3	1010-1,800
11-215-00603	Polishing Pond	24.2-25.4	7.8-8.7	7.8-8.3	560-900
11-215-00046	Sulfate Basin No. 5	24.1-25.4	7.9-8.9	7.9-8.2	430-750
11-215-00047	Fly Ash Basin No. 4	24.1-25.5	7.9-8.8	7.7-9.0	230-300

[a]Range of 12 measurements for temperature, pH and dissolved oxygen and 1 measurement for conductivity (50% and 100%)
[b]Dissolved oxygen
[c]Standard units
[d]Low values for 50% concentrations and high values for 100% concentrations.

[redacted]

Table 2 Water Quality Measurement Ranges During Chronic Toxicity Tests with *Pimephales promelas* on Surface Water Samples Collected from the Avtex Fibers Superfund Site, Front Royal, Virginia

Sample ID	Location	Temperature °C	DO (mg/L)	pH (s.u.)	Conductivity (μmhos/cm)
Control	NA	24.2-25.0	7.0-8.6	7.7-8.0	280
11-215-00601	Sulfate Basin No. 1	24.3-25.4	6.9-8.7	7.8-8.5	1,020-1,700
11-215-00602	Emergency Pond	24.3-25.5	6.8-8.9	7.8-8.4	1,100-1,800
11-215-00603	Polishing Pond	24.4-25.4	6.9-8.7	7.8-8.2	600-900
11-215-00046	Sulfate Basin No. 5	24.2-25.4	6.8-8.9	7.9-8.2	490-750
11-215-00047	Fly Ash Basin No. 4	24.2-25.5	6.8-8.8	7.6-9.0	290-300

[a]Range of 14 measurements for temperature, pH and dissolved oxygen and 1 measurement for conductivity (50% and 100%)
[b]Dissolved oxygen
[c]Standard units
[d]Low values for 50% concentrations and high values for 100% concentrations.

[redacted]

Table 3 Measured Ammonia Concentrations During a 7-Day Chronic Exposure of *Pimephales promelas* to Surface Water Samples From the Avtex Fibers Superfund Site, Front Royal Virginia, Conducted From May 21 through 28, 1997

Sample ID	Location	Total Ammonia [a]	
		As N (ppm)	As NH_3 (ppm)
Control	NA	<0.05	<0.06
100% 11-215-00601	Sulfate Basin No. 1	<0.05	<0.06
100% 11-215-00602	Emergency Pond	<0.05	<0.06
100% 11-215-00603 50% 11-215-00603	Polishing Pond	0.10 0.07	0.12 0.08
100% 11-215-00046	Sulfate Basin No. 5	<0.05	<0.06
100% 11-215-00047	Fly Ash Basin No. 4	<0.05	<0.06

[a]Ammonia was measured on pooled samples from the 3 replicates (day 7) using an Orion 290A ammonia meter equipped with an Orion 95-12 ammonia probe.

[redacted]

Table 4 Survival and Reproduction of *Ceriodaphnia dubia* During a 7-Day Chronic Exposure to Surface Water Samples From the Avtex Fibers Superfund Site, Front Royal Virginia, Conducted From May 21 through 27, 1997

Sample ID	Location	Percent Survival[a]	Mean Number of Neonates[b]
Control	NA	100	16.2
100% 11-215-00601 50% 11-215-00601	Sulfate Basin No. 1	100 100	26.2 20.9
100% 11-215-00602 50% 11-215-00602	Emergency Pond	90 100	24.7 20.8
100% 11-215-00603 50% 11-215-00603	Polishing Pond	90 100	15.7 21.8
100% 11-215-00046 50% 11-215-00046	Sulfate Basin No. 5	90 100	21.3 24.5
100% 11-215-00047 50% 11-215-00047	Fly Ash Basin No. 4	100 100	26.7 27.7

[a]Ten organisms were exposed per concentration.
[b]Average number of young per surviving female.

[redacted]

Table 5 Survival and Growth of *Pimephales promelas* During a 7-Day Chronic Exposure to Surface Water Samples From the Avtex Fibers Superfund Site, Front Royal Virginia, Conducted From May 21 through 28, 1997

Sample ID	Location	Percent Survival[a]	Mean Weight per Organism (mg)
Control	NA	98	0.44
100% 11-215-00601 50% 11-215-00601	Sulfate Basin No. 1	100 98	0.48 0.47
100% 11-215-00602 50% 11-215-00602	Emergency Pond	98 96	0.53 0.52
100% 11-215-00603 50% 11-215-00603	Polishing Pond	67[b] 49[b]	0.43 0.43
100% 11-215-00046 50% 11-215-00046	Sulfate Basin No. 5	98 98	0.48 0.48
100% 11-215-00047 50% 11-215-00047	Fly Ash Basin No. 4	62[b] 96	0.47 0.48

[a] Forty-five organisms were exposed per concentration.
[b]Significantly different ($P=0.05$) from the control.

[redacted]

Appendix A: Chain-of-Custody and Traffic Information

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-034

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:002344
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352) 332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	F	11-215-00603	Polish Pond	Water	5/14/97	5 Gal. Cube/4 C	P.promelas/D.magna Toxicity Test		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/16/97	J. Owusu-Yaw	5/17/97	1330						

AR300857

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-033

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:006986
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352)332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	F	11-215-00601	Sulfate Basin No. 1	Water	5/14/97	5 Gal. Cube/4 C	P.promelas/D.magna Toxicity Test		
	F	11-215-00602	Emergency Pond	Water	5/14/97	5 Gal. Cube/4 C	P.promelas/D.magna Toxicity Test		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/16/97	J. Owusu-Yaw	5/17/97	1330						

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-035

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4265
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:002368
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352) 332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	F	11-215-00046	Sulfate Basin No. 5	Water	5/12/97	5 Gal. Cube/4 C	P.promelas/D.magna Toxicity Test		
	F	11-215-00047	Fly Ash Basin No. 4	Water	5/12/97	5 Gal. Cube/4 C	P.promelas/D.magna Toxicity Test		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/16/97	J. Owusu-Yaw	5/17/97	1330						

AR300859

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
ESE QA Form No.: 021
Effective: FEB 1993

SUBJECT: WATER HARDNESS WORKSHEET

Sponsor: Weston
Project Number: 3197225-0100-3100

Test Substance: Surface water
Test Species: C. dubia + P. promelas

Data By: MO
Date: 5/21/97
Time: 1630

Normality of EDTA Titrant: 0.01 M

Correction Factor (based on standardization of EDTA Titrant): 0.97

Test Conc'n (units)	Sample Volume (mL)	Dilute to (mL)	Initial Buret Reading (mL)	Final Buret Reading (mL)	Total Titrant Used (mL)	TOTAL HARDNESS (mg/L) [corrected]
20% Perrier 80% milli-Q	100	—	0.0			78
mod Hard Recon	100	—	0.0			79
100% 00046	100	—	0.0	14.5	14.5	
100% 00047	100	—	0.0	11.6	11.6	
100% 00601	100	—	0.0	18.5	18.5	
100% 00602	100	—	0.0	21.4	21.4	
100% 00603	100	—	0.0	22.8	22.8	

Calculation of Total Hardness (mg/L as CaCO3): A x B x 1,000 / mL Sample

where A = mL of Titrant, and
B = mg CaCO3 equivalent to 1.00 mL EDTA Titrant
(1 mg CaCO3 = 1 mL EDTA Titrant)

Total Hardness x Correction Factor = [corrected] Total Hardness

[redacted]

AR300860

SUBJECT: WATER ALKALINITY WORKSHEET

Sponsor: Weston
Project Number: 3197225-0100-3100
Test Substance: Surface water
Test Species: C. dubia & P. promelas

Data By: MO
Date: 5/21/97
Time: 1630

Normality of H2SO4 (Sulfuric Acid): 0.02N

Correction Factor (based on standardization of H2SO4 titrant): 1.00

Test Concns (define units)	Sample Volume (mL)	Dilute To (mL)	Initial Buret Reading (mL)	Final Buret Reading (mL) To pH 4.5	Final Buret Reading (mL) To pH 4.2	Titrant Used (mL)	Total Alkalinity (mg/L as CaCO3)
20% Perrier 80% Milli-Q	100	—	0.0	6.2	—	6.2	62
Mod Hard Recon	100	—	0.0	6.3	—	6.3	63
100% 00046	100	—	0.0	13.1	—	13.1	131
100% 00047	100	—	0.0	5.9	—	5.9	59
100% 00601	100	—	0.0	30.4	—	30.4	304
100% 00602	100	—	0.0	30.6	—	30.6	306
100% 00603	100		0.0	19.4	—	19.4	194

Calculation of Total Alkalinities > 20 mg/L as CaCO3:

$$\text{Total Alkalinity} = \frac{B \times N \times 50{,}000}{\text{mL sample}}$$

where B = mL titrated, N = normality of acid

Total Alkalinity x Correction Factor = [corrected] Total Alkalinity

Calculation of Total Alkalinities < 20 mg/L as CaCO3:

$$\text{Total Alkalinity} = \frac{(2B-C) \times N \times 50{,}000}{\text{mL sample}}$$

where B = total mL titrant to pH 4.5
C = total mL titrant to pH 4.2
N = normality of acid

[redacted]

Appendix B: *Ceriodaphnia dubia* Test Data

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ____
ESE QA Form Number: 018
Effective: APR 1993

Project: 3197225-0100-3100

DAILY LOG

5/21/97 MO— 5 surface water samples were received on 5/17/97. On 5/21/97, a portion of each sample was warmed to test temperature. Samples 00046, 00047, and 00603 were gently aerated for ~5 minutes to adjust dissolved oxygen to ~100% saturation (initial DO's were >9.5 mg/L). The samples were also passed through a 0.1 mm sieve to remove indigenous organisms (appeared to be cladocerans). C. dubia + P. promelas were in normal condition at test initiation. MM-1 was set up to monitor temp in waterbath 3. Light intensity = 855 lux (LX-1).

5/22/97 MO— Monitored tests – renewed test solutions. Portions of the samples were ~~renewed~~ prepared MO 5/22/97 as on 5/21/97. MM-1 reads min: 24.3, max: 25.5°C. Reset.

5/23/97 MO— monitored tests – renewed test solutions. Portions of the samples were prepared as on 5/21/97. MM-1 reads min: 24.2, max: 25.5°C. Reset.

5/24/97 MO– Monitored tests – renewed test solutions. Portions of samples prepared as on 5/21/97. MM-1 reads min: 24.1 max: 25.0°C. Reset

5/25/97 MO– Monitored tests – renewed test solutions. Portions of the samples were prepared as on 5/21/97. MM-1 reads min: 24.5°C max: 26 Reset.

5/26/97 MO – Monitored tests – test solutions renewed. Portions of the samples were prepared as on 5/21/97. MM-1 reads min: 24.4, max: 25.7°C. Reset.

[redacted]

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ____
ESE QA Form Number: 018
Effective: APR 1993

Project: 3197225-0100-3100

DAILY LOG

5/27/97 MO – P. promelas test monitored + test solutions renewed. Portions of the samples were prepared as on 5/21/97. The C. dubia chronic test was concluded since >60% of the control females had produced 3 broods of neonates. Max-1 reads min 24.0, max: 25.3°C. Reset.

5/28/97 MO – P. promelas test ended. P. promelas from each replicate were transferred to a pre-weighed aluminum pan, rinsed with deionized water, and placed in an oven (100°C) to dry. Max-1 reads min 24.1, max 25.0°C. Measured total ammonia using Orion 290A meter + Orion 95-12 ammonia probe (calibrated with 0.10 and 10.0 ppm as N standards). Ammonia measured for final test solutions (the 3 replicates of each conc. were pooled):

Conc (%)	Total Ammonia ppm as N	Total Ammonia ppm as NH_3
Control	<0.05	<0.06
100% 00046	<0.05	<0.06
100% 00047	<0.05	<0.06
100% 00601	<0.05	<0.06
100% 00602	<0.05	<0.06
50% 00603	0.07	0.08
100% 00603	0.10	0.12

[redacted]

Environmental Science and Engineering, Inc.
Aquatic Toxicology Department
Gainesville, Florida

Page:
ESE QA Form Number: 106
Effective: August 1990

SUBJECT: DAILY FEEDING OF TEST ORGANISMS

Test Species: C. dubia
Sponsor: Weston
Test Substance: Surface water
Project Number: 3197225-0100-

Day	Date	Time	Initials	Food Type	Quantity	Comments
0	5/21/97	1445	MO	YTC + algae	0.1 mL each	per rep
1	5/22/97	1630	MO	YTC + algae	0.1 mL each	per rep
2	5/23/97	1545	MO	YTC + algae	0.1 mL each	per rep
3	5/24/97	1600	MO	YTC + algae	0.1 mL ea.	per rep.
4	5/25/97	1400	MO	YTC + algae	0.1 mL ea.	per rep.
5	5/26/97	1145	MO	YTC + algae	0.1 mL ea.	per rep.

FORM: TESTFEED [redacted]

SUBJECT: CERIODAPHNIA CHRONIC TEST DATA

Sponsor: Weston   Project No.: 3197225-0100-3100

Test Substance: Surface water   Test Species: Ceriodaphnia dubia

ANIMAL HISTORY

Lot No.: CCD052197   Date Neonates Collected: 5/21/97
Age of Neonates (hours): <24

See Page No. 61 of Cladoceran Neonate History Log   Condition of Neonates: Normal

TEST CONDITIONS

Protocol: EPA/600/4-91/002

Dilution Water: 20% Perrier 80% milli-Q   Type Lighting: Fluorescent   Photoperiod: 16 Hr L 8 Hr D

Test Container: 30 mL Plastic Beaker   Solution Volume: 15 mL

TEST SOLUTION PREPARATION

Test Concentration % mg/L	CTRL	50	100			
Amount of Effluent/ Stock Added (mL)	—	100	200			
Amount of Dilution Water Added (mL)	200	100	—			
Test Solution Observations		For all 5 samples →				

TEST VALIDITY CRITERIA

Number Young per Surviving Control Adult: 16.2

Percent of Surviving Control Adults with 3 Broods: 80%

TEST SUMMARY

Test Concentration	Number Young	Number Broods	Female Adults	# Young per Adult	# Broods per Adult
Control	162	28	10A, 0D	16.2	2.8
00046 50% / 100%	245 / 213	30 / 28	10A / 9A, 1D	24.5 / 21.3	3.0 / 2.8
00047 50% / 100%	~~213~~ 227 / 267	29 / 29	10A / 10A	①~~21.3~~ 22.7 / 26.7	2.9 / ~~2.6~~ 2.9
00601 50% / 100%	209 / 262	27 / 28	10A / 10A	20.9 / 26.2	2.7 / 2.8
00602 50% / 100%	187 / 247	24 / 28	10A(1M) / 9A, 1D	20.8 / 24.7	①~~2.4~~ 2.7 / 2.8
00603 50% / 100%	218 / 157	27 / 21	10A / 9A, 1D	21.8 / 15.7	2.7 / 2.1

ADDITIONAL COMMENTS: Surface water samples (prefix 11-215) 00046, 00047, 00601, 00602, 00603. A= Alive, D= Dead, M=Male

Test Data Recorded By: MO   Date: 5/21/97

Test Summary Recorded By: MO   Date: 5/27/97

[redacted]

① MO 5/27/97 (wp)

GAINESVILLE, FLORIDA

ESE QA FORM: 055
EFFECTIVE: April, 1986

SUBJECT: CERIODAPHNIA CHRONIC TEST - WATER QUALITY

Sponsor: Weston | Project No.: 3197225-0100

Test Substance: Surface water | Test Species: Ceriodaphnia dubia

Test Conc.	Parameter	Day 0	Day 1 New	Day 1 Old	Day 2 New	Day 2 Old	Day 3 New	Day 3 Old	Day 4 New	Day 4 Old	Day 5 New	Day 5 Old	Day 6 New	Day 6 Old	Day 7 Old
Control	Temp.	25.1	24.4	24.5	25.0	24.8	25.0	24.3	25.1	24.8	25.1	24.9	–	24.2	
	D.O.	8.4	8.6	8.0	8.5	8.1	8.5	8.0	8.3	8.0	8.4	8.0	–	7.9	
	pH	8.0	7.7	7.8	8.0	7.9	7.9	7.9	7.8	8.0	7.9	8.0	–	8.0	
	Alk.		–	–	–	–	–	–	–	–	–	–	–	–	
	Hard.		–	–	–	–	–	–	–	–	–	–	–	–	
	Conduct.	170	–	–	–	–	–	–	–	–	–	–	–	–	
00046 50%	Temp.	24.9	24.5	24.6	24.8	24.7	24.8	24.4	25.3	24.7	24.9	24.8	–	24.1	
	D.O.	8.5	8.6	8.1	8.6	8.0	8.6	7.9	8.4	8.0	8.5	8.1	–	8.0	
	pH	8.1	7.9	7.9	8.1	8.0	8.0	8.1	7.9	8.0	8.0	8.0	–	8.1	
	Cond	430 330	–	–	–	–	–	–	–	–	–	–	–	–	
00046 100%	Temp.	24.6	24.5	24.5	24.6	24.7	24.7	24.3	25.4	24.8	24.6	24.7	–	24.1	
	D.O.	8.7	8.9	8.1	8.8	8.2	8.7	7.9	8.5	7.9	8.6	8.0	–	8.0	
	pH	8.2	8.1	8.0	8.2	8.1	8.2	8.2	[illegible]	8.1	8.2	8.1	–	8.1	
	Cond	350 308	–	–	–	–	–	–	[illegible]	–	–	–	–	–	
00047 50%	Temp.	25.0	24.4	24.6	24.8	24.8	24.8	24.3	25.3	24.8	24.9	24.8	–	24.1	
	D.O.	8.6	8.7	8.0	8.7	8.2	8.6	8.1	8.4	8.0	8.6	8.1	–	7.9	
	pH	8.4	8.2	8.0	8.4	8.1	8.3	8.0	8.3	8.0	8.4	8.1	–	8.0	
	Cond	330 470	–	–	–	–	–	–	–	–	–	–	–	–	
00047 100%	Temp.	24.7	24.5	24.6	24.7	24.7	24.6	24.3	25.5	24.7	24.7	24.7	–	24.2	
	D.O.	8.7	8.8	7.9	8.8	8.1	8.7	8.0	8.5	8.0	8.6	8.0	–	7.9	
	pH	9.0	8.8	7.7	8.9	8.0	8.8	7.8	8.8	7.7	8.8	7.8	–	7.8	
	Cond	350 350	–	–	–	–	–	–	–	–	–	–	–	–	
00601 50%	Temp.	25.0	24.5	24.5	24.8	24.8	24.9	24.2	25.2	24.7	24.8	24.7	–	24.1	
	D.O.	8.4	8.5	8.1	8.6	8.2	8.5	8.0	8.4	8.0	8.5	8.0	–	7.8	
	pH	8.2	8.0	8.2	8.2	8.0	8.1	8.0	8.0	7.9	8.1	8.0	–	7.9	
	Cond	980	–	–	–	–	–	–	–	–	–	–	–	–	
00607 100%	Temp.	24.7	24.5	24.5	24.7	24.7	24.7	24.3	25.4	24.6	24.7	24.8	–	24.2	
	D.O.	8.4	8.5	7.9	8.7	8.0	8.6	7.9	8.6	7.9	8.6	8.0	–	7.9	
	pH	8.4	8.3	8.4	8.4	8.2	8.3	7.9	8.3	8.0	8.3	8.0	–	7.9	
	Alk.	–	–	–	–	–	–	[illegible]	–	–	–	–	–	–	
	Hard.	–	–	–	–	–	–	–	–	–	–	–	–	–	
	Conduct.	1700	–	–	–	–	–	–	–	–	–	–	–	–	

	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Temp. Device	FS 5	FS 5	FS 5	FS 5	FS 5	FS 5	FS 5
pH Meter	SA 290A	SA 290A	SA 290A	SA 290A	SA 290A	SA 290A	SA 290A
D.O. Meter	DO-1	DO-1	DO-1	DO-1	DO-1	DO-1	DO-1
Hard. Method	Titr	–	–	–	–	–	–
Alk. Method	Titr	–	–	–	–	–	–
Conductivity Meter	SCT 3	–	–	–	–	–	–
INITIALS:	MO	MO	MO	MO	MO	MO	MO
DATE:	5/21/97	5/22/97	5/23/97	5/24/97	5/25/97	5/26/97	5/27/97
TIME:	1345	1400	1345	1400	1200	1100	1315

Hard/Alk = mg/L as $CaCO_3$

MO 5/21/97 (WP)

Temp. = °C

D.O. = mg/L

Conduct. = umhos/cm

[redacted]

Temperature was continuously recorded on channel of the SCM temperature monitor.

AR300867

EFFECTIVE: April, 1986

SUBJECT: CERIODAPHNIA CHRONIC TEST - WATER QUALITY

Sponsor: Weston Project No.: 3197225-0100

Test Substance: Surface water Test Species: Ceriodaphnia dubia

Test Conc.	Parameter	Day 0	Day 1 New	Day 1 Old	Day 2 New	Day 2 Old	Day 3 New	Day 3 Old	Day 4 New	Day 4 Old	Day 5 New	Day 5 Old	Day 6 New	Day 6 Old	Day 7 Old
00602 50%	Temp.	25.0	24.5	24.4	24.9	24.6	24.9	24.3	25.3	24.7	24.8	24.8	—	24.3	
	D.O.	8.4	8.6	8.0	8.6	8.1	8.5	8.0	8.4	8.0	8.5	7.9	—	7.8	
	pH	8.0	7.8	7.9	8.0	8.0	8.0	8.1	7.9	8.0	8.0	8.1	—	8.0	
	Alk.	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Hard.	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Conduct.	1010	—	—	—	—	—	—	—	—	—	—	—	—	
00602 100%	Temp.	24.6	24.5	24.5	24.6	24.6	24.8	24.3	25.5	24.6	24.4	24.9	—	24.3	
	D.O.	8.5	8.6	8.0	8.9	7.9	8.6	8.0	8.6	8.0	8.7	7.9	—	7.8	
	pH	8.0	7.9	8.3	8.0	8.2	8.1	8.3	8.1	8.2	8.0	8.2	—	8.2	
	Cond	1800	—	—	—	—	—	—	—	—	—	—	—	—	
00603 50%	Temp.	24.9	24.4	24.6	24.8	24.7	24.8	24.4	25.3	24.4	24.8	24.9	—	24.2	
	D.O.	8.5	8.6	8.2	8.5	7.9	8.5	8.0	8.4	8.0	8.5	8.0	—	7.9	
	pH	8.0	7.8	8.0	8.1	8.1	7.9	8.0	7.9	8.0	8.0	8.0	—	8.1	
	Cond	560	—	—	—	—	—	—	—	—	—	—	—	—	
00603 100%	Temp.	24.6	24.4	24.6	24.7	24.7	24.7	24.4	25.4	24.7	24.6	24.8	—	24.2	
	D.O.	8.6	8.5	8.1	8.7	8.0	8.6	7.9	8.5	8.0	8.7	7.9	—	7.8	
	pH	8.1	8.0	8.2	8.1	8.1	8.0	8.3	8.0	8.2	8.1	8.2	—	8.2	
	Cond	900	—	—	—	—	—	—	—	—	—	—	—	—	
	Temp.														
	D.O.														
	pH														
	Temp.														
	D.O.														
	pH														
	Temp.														
	D.O.														
	pH														
	Alk.														
	Hard.														
	Conduct.														

	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Temp. Device	FS 5	FS 6	FS 5	FS 5	FS 5	FS 5	FS 5	
pH Meter	[illegible]	SA290A	SA290A	SA290A	SA290A	SA290A	SA290A	
D.O. Meter	DO-1	DO-1	DO-1	DO-1	DO-1	DO-1	DO-1	
Hard. Method	—	—	—	—	—	—	—	
Alk. Method	—	—	—	—	—	—	—	
Conductivity Meter	SCT 3	—	—	—		—	—	
INITIALS:	MO	MO	MO	MO	MO	MO	MO	
DATE:	5/21/97	5/22/97	5/23/97	5/24/97	5/25/97	5/26/90	5/27/97	
TIME:	1345	1400	1345	1400	1200	1100	1315	

Hard/Alk = mg/L as $CaCO_3$

Temp. = °C

D.O. = mg/L

Conduct. = umhos/cm

Temperature was continuously recorded on channel ____ of the SCM temperature monitor. [redacted]

ESE TOXICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE:
ESE QA FORM: 054
EFFECTIVE: April, 1986

SUBJECT: CERIODAPHNIA CHRONIC TEST - SURVIVAL

Sponsor: Weston
Project No.: 3197225-0100
Test Substance: Surface water
Test Species: Ceriodaphnia dubia

Test Conc.	Day	Replicate 1 AD	1 N*	2 AD	2 N	3 AD	3 N	4 AD	4 N	5 AD	5 N	6 AD	6 N	7 AD	7 N	8 AD	8 N	9 AD	9 N	10 AD	10 N
Control	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	0	A	0	A	0	A	0	A	3	A	0	A	0	A	3	A	0	A	3
	4	A	3	A	4	A	3	A	4	A	0	A	4	A	5	A	4	A	2	A	1
	5	A	7	A	6	A	8	A	8	A	5	A	5	A	0	A	7	A	8	A	6
	6	A	9	A	8	A	6	A	10	A	3	A	4	A	8	A	0	A	6	A	9
	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			19		18		17		22		11		13		13		14		16		19
00046 50%	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	0	A	4	A	5	A	4	A	4	A	4	A	4	A	4	A	3	A	1
	4	A	6	A	0	A	1	A	0	A	0	A	0	A	0	A	0	A	6	A	2
	5	A	8	A	9	A	10	A	9	A	11	A	10	A	8	A	9	A	0	A	8
	6	A	12	A	10	A	12	A	13	A	14	A	15	A	15	A	11	A	11	A	2
	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			26		23		28		26		29		29		27		24		20		13
00046 100%	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	0	A	3	A	4	A	0	A	5	A	4	A	4	A	3	A	4	A	5
	4	A	5	A	5	A	0	A	5	A	0	A	0	A	5	A	6	A	0	A	0
	5	A	10	A	0	A	10	A	0	A	9	D	4	A	0	A	0	A	10	A	10
	6	A	12	A	11	A	12	A	13	A	3	|	|	A	11	A	11	A	16	A	13
	7	-	-	-	-	-	-	-	-	-	-	|	|	-	-	-	-	-	-	-	-
			27		19		26		18		17		8		20		20		30		28
00047 50%	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	4	A	0	A	5	A	5	A	5	A	4	A	5	A	4	A	5	A	5
	4	A	0	A	3	A	0	A	7	A	0	A	8	A	0	A	0	A	10	A	0
	5	A	9	A	8	A	10	A	0	A	10	A	0	A	11	A	10	A	0	A	11
	6	A	18	A	15	A	14	A	16	A	2	A	15	A	15	A	16	A	14	A	13
	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			31		26		29		28		17		27		31		30		29		29
00047 100%	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	0	A	5	A	4	A	5	A	0	A	5	A	4	A	6	A	5	A	5
	4	A	1	A	8	A	0	A	0	A	4	A	0	A	8	A	6	A	9	A	8
	5	A	9	A	0	A	10	A	10	A	8	A	11	A	0	A	0	A	0	A	12
	6	A	9	A	11	A	15	A	15	A	14	A	16	A	17	A	16	A	11	A	0
	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			19		24		29		30		26		32		29		28		25		25

INITIALS:	DAY 0 MO	DAY 1 MO	DAY 2 MO	DAY 3 MO	DAY 4 MO	DAY 5 MO	DAY 6 MO			
DATE:	5/21/97	5/22/97	5/23/97	5/24/97	5/25/97	5/26/97	5/27/97			
TIME:	1430	1515	1415	1430.	1230	1130	1330			

*Number of neonates recorded for day observed; not cumulative.

AD = Adult
N = Neonate
A = Alive

[redacted]

AR300869

SUBJECT: CERIODAPHNIA CHRONIC TEST - SURVIVAL

Sponsor: Weston
Project No.: 3197225-0100
Test Substance: Surface water
Test Species: Ceriodaphnia dubia

Test Conc.	Day	1 AD	1 N*	2 AD	2 N	3 AD	3 N	4 AD	4 N	5 AD	5 N	6 AD	6 N	7 AD	7 N	8 AD	8 N	9 AD	9 N	10 AD	10 N
00601 50%	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	4	A	6	A	2	A	5	A	4	A	5	A	4	A	4	A	4	A	6
	4	A	0	A	0	A	0	A	0	A	9	A	0	A	0	A	0	A	9	A	9
	5	A	8	A	7	A	8	A	7	A	0	A	11	A	10	A	11	A	0	A	0
	6	A	0	A	11	A	10	A	12	A	1	A	2	A	13	A	11	A	16	A	0
	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
			12		24		20		24		14		18		27		26		29		15
00601 100%	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	0	A	3	A	4	A	5	A	4	A	5	A	4	A	5	A	6	A	6
	4	A	0	A	0	A	0	A	8	A	0	A	8	A	10	A	0	A	11	A	10
	5	A	5	A	12	A	11	A	0	A	11	A	0	A	0	A	11	A	1	A	8
	6	A	0	A	12	A	16	A	15	A	13	A	14	A	16	A	9	A	17	A	2
	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
			5		27		31		28		28		27		30		25		35		26
00602 50%	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	5	A	3	A	4	A	3	A	3	A	4	A	4	A	5	A	4	A	0
	4	A	0	A	1	A	8	A	4	A	1	A	8	A	9	A	9	A	8	A	0
	5	A	8	A	0	A	0	A	0	A	5	A	0	A	11	A	1	A	6	A	0
	6	A	15	A	0	A	13	A	14	A	0	A	16	A	0	A	15	A	0	A ⊕	0
	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
			28		4		25		21		9		28		24		3–		18		—
00602 100%	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	4	A	4	A	5	A	5	A	4	A	4	A	3	A	5	A	4	A	4
	4	A	7	A	9	A	8	A	9	A	10	A	7	D	0	A	10	A	0	A	7
	5	A	0	A	10	A	0	A	0	A	0	A	0			A	0	A	10	A	1
	6	A	16	A	0	A	15	A	16	A	15	A	12			A	17	A	14	A	12
	7	—	—	—	—	—	—	—	—	—	—	—	—			—	—	—	—	—	—
			27		23		28		30		29		23		3		32		28		24
00603 50%	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	2	A	4	A	4	A	3	A	4	A	6	A	5	A	0	A	4	A	5
	4	A	8	A	0	A	0	A	4	A	0	A	0	A	0	A	7	A	1	A	6
	5	A	0	A	8	A	8	A	2	A	9	A	10	A	9	A	1	A	0	A	1
	6	A	5	A	7	A	5	A	13	A	15	A	14	A	12	A	14	A	9	A	13
	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
			15		19		17		22		28		30		26		22		14		25

⊕ male

INITIALS:	DAY 0 MO	DAY 1 MO	DAY 2 MO	DAY 3 MO	DAY 4 MO	DAY 5 MO	DAY 6 MO			
DATE:	5/21/97	5/22/97	5/23/97	5/24/97	5/25/97	5/26/97	5/27/97			
TIME:	1430	1515	1415	1430	1230	1130	1330			

*Number of neonates recorded for day observed; not cumulative.

AD = Adult
N = Neonate
A = Alive

[redacted]

SUBJECT: CERIODAPHNIA CHRONIC TEST - SURVIVAL

Sponsor: Weston
Project No.: 3197225-0100
Test Substance: Surface water
Test Species: Ceriodaphnia dubia

Test Conc.	Day	Replicate 1 AD	1 N*	2 AD	2 N	3 AD	3 N	4 AD	4 N	5 AD	5 N	6 AD	6 N	7 AD	7 N	8 AD	8 N	9 AD	9 N	10 AD	10 N
00603 100%	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	0	A	0	A	1	A	0	A	2	A	3	A	3	A	4	A	0	A	3
	4	D	0	A	8	A	3	A	9	A	1	A	0	A	0	A	0	A	0	A	0
	5	|	|	A	0	A	0	A	0	A	9	A	8	A	6	A	8	A	0	A	7
	6	|	|	A	0	A	12	A	12	A	8	A	15	A	8	A	7	A	8	A	12
	7	|	|	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
			0		8		16		21		20		26		17		19		8		22
—	1																				
	2																				
	3																				
	4																				
	5																				
	6																				
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	5																				
	6																				
	7																				
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	2																				
	3																				
	4																				
	5																				
	6																				
	7																				

INITIALS:	DAY 0 MO	DAY 1 MO	DAY 2 MO	DAY 3 MO	DAY 4 MO	DAY 5 MO	DAY 6 MO			
DATE:	5/21/97	5/22/97	5/23/97	5/24/97	5/25/97	5/26/97	5/27/97			
TIME:	1430	1515	1415	1430	1230	1130	1330			

*Number of neonates recorded for day observed; not cumulative.

AD = Adult
N = Neonate
A = Alive

[redacted]

Appendix C: *Pimephales promelas* Test Data

[redacted]

Environmental Science and Engineering, Inc. Page:
Aquatic Toxicology Department ESE QA Form Number: 106
Gainesville, Florida Effective: August 1990

SUBJECT: DAILY FEEDING OF TEST ORGANISMS

Test Species: P. promelas Sponsor: Weston
Test Substance: Surface water Project Number: 3197225-0100

Day	Date	Time	Initials	Food Type	Quantity	Comments
0	5/21/97	1545	MO	Brine shrimp	~0.15 mL	per rep.
1	5/22/97	0830	MO	BS	0.15 mL	per rep.
1	5/22/97	1630	MO	BS	0.15 mL	per rep.
2	5/23/97	0800	MO	BS	0.15 mL	per rep.
2	5/23/97	1545	MO	BS	0.15 mL	per rep.
3	5/24/97	1145	MO	BS	0.15 mL	per rep.
3	5/24/97	1600	MO	BS	0.15 mL	per rep.
4	5/25/97	1045	MO	BS	0.15 mL	per rep.
4	5/25/97	1400	MO	BS	0.15 mL	per rep.
5	5/26/97	0915	MO	BS	0.15 mL	per rep.
5	5/26/97	1300	MO	BS	0.15 mL	per rep.
6	5/27/97	0730	MO	BS	0.15 mL	per rep.
6	5/27/97	1400	MO	BS	0.15 mL	per rep.

FORM: TESTFEED [redacted]

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

SUBJECT: FATHEAD MINNOW SHORT-TERM CHRONIC TOXICITY TEST

SPONSOR: Weston PROJECT NUMBER: 3197225-0100-3100

TEST EFFLUENT: Surface water TEST SPECIES: Pimephales promelas

ANIMAL HISTORY

SOURCE OF LARVAE: [illegible] Florida Bioassay DATE OF HATCH: 5/21/97

LARVAE LOT NO.: 97-37 CONDITION OF LARVAE: Normal

SEE PAGE NO.: 77 OF ANIMAL RECEIPT LOG

SEE PAGE NO.: 138 OF FISH HOLDING LOG FOR RAW DATA ON LARVAE HISTORY

TEST CONDITIONS

TEST CONTAINER	TEST SOLUTION HEIGHT:	TEST CHAMBER VOLUME:	TEST SOLUTION VOLUME:	TEST CONTAINER COMPOSITION:
DIAMETER: 100 mm HEIGHT: 50 mm	40 mm	340 mL	250 mL	GLASS

PROTOCOL: EPA/600/4-91/002 TYPE LIGHTING: Fluorescent PHOTOPERIOD: 16 Hr L 8 Hr D

DILUTION WATER: Moderately Hard Reconstituted water

EFFLUENT DATA FOUND ON PAGE NO.: ____ OF EFFLUENT LOG

TEST SOLUTIONS SPLIT INTO 3 EQUAL AMOUNTS

TEST CONCENTRATION (% effluent)	CON-TROL	50	100				
VOLUME OF EFFLUENT ADDED (mL)	NA	375	750				
VOLUME OF DILUTION WATER (mL)	750	375	—				

ADDITIONAL COMMENTS: Surface water samples (11-215) for ER : 00046, 00047, 00601, 00602, 00603

DATA RECORDED BY: MO DATE: 5/21/97

FORM: FHMCHR1

[redacted]

AR300874

Aquatic Toxicology Department
Gainesville, Florida

Page:
QA Form: 053
Effective: October 1989

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston Test Substance: Surface water
Day: 0 Project Number: 3197225-0100-3100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	8.0	—	8.5	—	280	24.7	—
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046 50%	A	15	N	8.1	—	8.6	—	490	24.6	—
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046 100%	A	15	N	8.2	—	8.7	—	750	24.6	—
	B	15	N	—	—	—	—	—	—	
	C	15	N	—	—	—	—	—	—	
00047 50%	A	15	N	8.5	—	8.6	—	290	24.7	—
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00047 100%	A	15	N	9.0	—	8.7	—	300	24.7	—
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00601 50%	A	15	N	8.2	—	8.5	—	1020	24.7	—
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00601 100%	A	15	N	8.4	—	8.4	—	1700	24.7	—
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	

Comments:	Recorded by: MO	Meter: SA290A	Meter: DO-1	Meter: SCT-3	Meter: FS-5
	Date: 5/21/97	Recorded by: MO			
	Time: 1530	Date: 5/21/97		Time: 1845	

[redacted]

Aquatic Toxicology Department
Gainesville, Florida

Page:
QA Form: 053
Effective: October 1989

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston Test Substance: Surface water

Day: 0 Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
00602 50%	A	15	N	8.0	—	8.5	—	1100	24.6	—
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00602 100%	A	15	N	8.0	—	8.5	—	1800	24.6	—
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00603 50%	A	15	N	8.0	—	8.5	—	600	24.7	—
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00603 100%	A	15	N	8.1	—	8.6	—	900	24.6	—
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:	Recorded by: MD Date: 5/21/97 Time: 1530	Meter: SA250A	Meter: DO-1	Meter: SCT-3	Meter: FS-5
		Recorded by: MO	Date: 5/21/97	Time: 1345	

[redacted]

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Aquatic Toxicology Department
Gainesville, Florida

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Effective: October 1989

SUBJECT: P. promelas — SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston Test Substance: Surface water

Day: 1 Project Number: 3197225-0100-3100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	7.7	7.8	8.5	7.8	—	24.5	24.6
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046 50%	A	15	N	7.9	8.0	8.7	7.7	—	24.5	24.6
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046 100%	A	15	N	8.1	8.0	8.9	7.8	—	24.5	24.6
	B	15	N	—	—	—	—	—	—	
	C	15	N	—	—	—	—	—	—	
00047 50%	A	15	N	8.3	7.9	8.6	7.6	—	24.5	24.7
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00047 100%	A	15	N	8.8	7.6	8.8	7.7	—	24.5	24.6
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00601 50%	A	15	N	8.0	8.2	8.5	7.6	—	24.4	24.7
	B	15	1 leth	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00601 100%	A	15	N	8.3	8.4	8.5	7.5	—	24.5	24.7
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—

Comments:	Recorded by:	Meter:	Meter:	Meter:	Meter:
leth = lethargic	MO	5A29-A	DO-1	—	FS-8
	Date: 5/22/97	Recorded by: MO			
	Time: 1600	Date: 5/22/97		Time: 1400	

[redacted]

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SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston
Test Substance: Surface water
Day: 1
Project Number: 3197225-0100-3100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
00602 50%	A	15	N	7.8	8.1	8.5	7.7	—	24.5	24.7
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00602 100%	A	15	N	7.9	8.4	8.6	7.8	—	24.5	24.8
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00603 50%	A	15	N	7.9	8.0	8.5	7.6	—	24.5	24.7
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00603 100%	A	15	N	8.0	8.2	8.5	7.3	—	24.6	24.8
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:

Recorded by: MO
Date: 5/22/97
Time: 1600

Meter: SA290A
Meter: DO-1
Meter: —
Meter: FS-5

Recorded by: MO
Date: 5/22/97
Time: 1400

[redacted]

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Aquatic Toxicology Department
Gainesville, Florida

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Effective: October 1989

SUBJECT: P. promelas **SHORT-TERM CHRONIC TOXICITY TEST**

Sponsor: Weston Test Substance: Surface water

Day: 2 Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	8.0	7.9	8.4	7.9	—	24.8	24.7
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046	A	15	N	8.1	8.0	8.6	8.0	—	24.8	24.8
	B	15	N	—	—	—	—	—	—	—
50%	C	15	N	—	—	—	—	—	—	—
00046	A	15	N	8.2	8.2	8.8	7.9	—	24.6	24.8
	B	15	N	—	—	—	—	—	—	—
100%	C	15	N	—	—	—	—	—	—	[illegible]
00047	A	15	N	8.5	7.8	8.5	7.6	—	24.8	24.9
	B	15	N	—	—	—	—	—	—	—
50%	C	15	N	—	—	—	—	—	—	—
00047	A	15	N	8.9	7.7	8.8	7.5	—	24.7	24.8
	B	15	N	—	—	—	—	—	—	—
100%	C	15	N	—	—	—	—	—	—	—
00601	A	15	N	8.2	8.2	8.5	7.8	—	24.7	24.9
	B	15	N	—	—	—	—	—	—	—
50%	C	15	N	—	—	—	—	—	—	—
00601	A	15	N	8.4	8.5	8.7	7.6	—	24.7	24.8
	B	15	N	—	—	—	—	—	—	—
100%	C	15	N	—	—	—	—	—	—	—

Comments:	Recorded by: MO Date: 05/23/97 Time: 1515	Meter: SA290A	Meter: DO-1	Meter: —	Meter: FS-5
		Recorded by: MO Date: 5/23/97		Time: 1345	

[redacted]

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SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston Test Substance: Surface water

Day: 2 Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
00602 50%	A	15	N	8.0	8.2	~~8.4~~ 8.7 MO 5/23/97	7.7	—	24.7	24.8
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00602 100%	A	15	N	8.0	8.4	8.9	7.5	—	24.6	24.6
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00603 50%	A	14	1 Dead	8.0	8.1	8.5	7.6	—	24.7	24.7
	B	15	N	—	—	—	—	—	—	—
	C	14	1 Dead	—	—	—	—	—	—	—
00603 100%	A	15	N	8.1	8.2	8.7	7.3	—	24.7	24.6
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:

Recorded by: MO
Date: 5/23/97
Time: 1515

Meter: SA290A
Meter: D.O.1
Meter: —
Meter: FS-5

Recorded by: MO
Date: 5/23/97
Time: 1345

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Gainesville, Florida

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SUBJECT: P. promelas **SHORT-TERM CHRONIC TOXICITY TEST**

Sponsor: Weston
Test Substance: Surface water
Day: 3
Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	8.0	7.8	8.6	7.8	—	24.9	24.4
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046 50%	A	15	N	8.1	8.0	8.6	7.7	—	24.8	24.4
	B	14	1 Dead	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046 100%	A	15	N	8.2	8.1	8.7	7.7	—	24.7	24.3
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00047 50%	A	15	N	8.4	7.9	8.6	7.8	—	24.8	24.3
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00047 100%	A	14	1 Dead	8.8	7.6	8.7	7.6	—	24.6	24.4
	B	13	2 Dead	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00601 50%	A	15	N	8.1	7.9	8.6	7.6	—	24.8	24.4
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00601 100%	A	15	N	8.3	7.8	8.6	7.6	—	24.7	24.5
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—

Comments:	Recorded by: MO Date: 5/24/97 Time: 1515	Meter: SA 290A	Meter: DO-1	Meter: —	Meter: FS-5
		Recorded by: MO Date: 5/24/97		Time: 1400	

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Gainesville, Florida

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SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston
Test Substance: Surface water
Day: 3
Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
00602	A	15	N	8.0	7.9	8.5	7.6	—	24.9	24.5
	B	15	N	—	—	—	—	—	—	—
50%	C	14	1 Dead	—	—	—	—	—	—	—
00602	A	15	N	8.1	7.9	8.6	7.5	—	24.8	24.4
	B	15	N	—	—	—	—	—	—	—
100%	C	15	N	—	—	—	—	—	—	—
00603	A	11	3 Dead	8.0	8.0	8.6	7.5	—	24.8	24.4
	B	12	3 Dead	—	—	—	—	—	—	—
50%	C	13	1 Dead	—	—	—	—	—	—	—
00603	A	13	2 Dead	8.0	7.8	8.6	7.4	—	24.7	24.5
	B	10	5 Dead	—	—	—	—	—	—	—
100%	C	12	3 Dead	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:	Recorded by: MO Date: 5/24/97 Time: 1515	Meter: 8470A	Meter: DO-1	Meter: —	Meter: FS-5
		Recorded by: MO	Date: 5/24/97	Time: 1400	

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Gainesville, Florida

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SUBJECT: P. promelas **SHORT-TERM CHRONIC TOXICITY TEST**

Sponsor: Weston Test Substance: Surface water

Day: 4 Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	7.9	7.7	8.2	7.0	—	25.0	24.8
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046 50%	A	15	N	8.0	7.9	8.3	7.1	—	25.2	24.9
	B	14	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046 100%	A	15	N	8.1	8.0	8.5	7.0	—	25.4	24.8
	B	15	N	—	—	—	—	—	—	
	C	15	N	—	—	—	—	—	—	
00047 50%	A	14	1 Dead	8.3	8.0	8.3	7.2	—	25.2	24.9
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00047 100%	A	14	N	8.8	7.6	8.5	7.1	—	25.5	24.9
	B	9	4 Dead	—	—	—	—	—	—	—
	C	15	1 Leth	—	—	—	—	—	—	—
00601 50%	A	15	N	8.1	8.0	8.4	7.1	—	25.2	24.9
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00601 100%	A	15	N	8.3	7.8	8.6	7.0	—	25.4	24.8
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	

Comments:	Recorded by: MO	Meter: SA720A	Meter: DO-1	Meter: —	Meter: ES-5
	Date: 5/25/97	Recorded by: MO			
	Time: 1300	Date: 5/25/97		Time: 1200	

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SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston Test Substance: Surface water

Day: 4 Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
00602 50%	A	15	N	8.0	7.9	8.4	7.2	—	25.3	24.9
	B	14	1 Dead	—	—	—	—	—	—	—
	C	14	N	—	—	—	—	—	—	—
00602 100%	A	15	N	8.1	7.8	8.6	7.0	—	25.5	25.0
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00603 50%	A	8	3 Dead	7.9	7.9	8.4	7.1	—	25.2	25.0
	B	10	2 Dead	—	—	—	—	—	—	—
	C	11	2 Dead	—	—	—	—	—	—	—
00603 100%	A	13	N	8.0	7.9	8.5	7.2	—	25.4	25.1
	B	10	N	—	—	—	—	—	—	—
	C	12	1 Leth	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:

Recorded by: MO
Date: 5/25/97
Time: 1300

Meter: SA290A Meter: DO-1 Meter: — Meter: FS-5

Recorded by: MO
Date: 5/25/97 Time: 1200

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Gainesville, Florida

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Effective: October 1989

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston Test Substance: Surface water

Day: 5 Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	8.0	7.9	8.4	7.4	—	25.0	24.9
	B	15	N	—	—	—	—	—	—	—
	C	14	1 Dead	—	—	—	—	—	—	—
00046 50%	A	15	N	8.1	7.9	8.5	7.5	—	24.8	25.0
	B	14	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046 100%	A	15	N	8.2	8.0	8.6	7.4	—	24.6	25.1
	B	14	1 Dead	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00047 50%	A	13	1 Dead	8.4	8.1	8.5	7.3	—	24.8	~~24.8~~ 25.0
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00047 100%	A	13	1 Dead	8.8	7.7	8.6	7.4	—	24.7	25.1
	B	6	3 Dead	—	—	—	—	—	—	—
	C	14	1 Dead	—	—	—	—	—	—	—
00601 50%	A	15	N	8.1	8.0	8.4	7.3	—	24.9	25.1
	B	14	1 Dead	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00601 100%	A	15	N	8.3	7.8	8.6	7.3	—	24.7	25.1
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—

Comments:	Recorded by: MO	Meter: SA290A	Meter: DO-1	Meter: —	Meter: ES5
	Date: 5/26/97	Recorded by: MO			
	Time: 1215	Date: 5/26/97		Time: 1100	

[redacted]

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Gainesville, Florida

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SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston
Test Substance: Surface water
Day: 5
Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
00602 50%	A	15	N	8.0	7.9	8.5	7.4	—	24.8	25.2
	B	14	N	—	—	—	—	—	—	—
	C	14	N	—	—	—	—	—	—	—
00602 100%	A	15	N	8.0	7.9	8.7	7.3	—	24.6	25.3
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00603 50%	A	8	N	8.0	7.9	8.6	7.4	—	24.8	25.3
	B	10	N	—	—	—	—	—	—	—
	C	11	N	—	—	—	—	—	—	—
00603 100%	A	12	1 Dead	8.1	7.9	8.7	7.2	—	24.6	25.3
	B	10	N	—	—	—	—	—	—	—
	C	12	1 Leth	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:

Recorded by: MO
Date: 5/26/97
Time: 1216

Meter: SA720A
Meter: DO-1
Meter: —
Meter: FS-5

Recorded by: MO
Date: 5/26/97
Time: 1100

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SUBJECT: P. promelas — SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston — Test Substance: Surface water
Day: 6 — Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	7.8	7.8	8.3	7.3	—	24.9	24.8
	B	15	N	—	—	—	—	—	—	—
	C	14	N	—	—	—	—	—	—	—
00046 50%	A	15	N	7.9	7.9	8.4	7.4	—	24.7	24.9
	B	14	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00046 100%	A	15	N	8.0	7.9	8.6	7.3	—	24.6	24.9
	B	14	N	—	—	—	—	—	—	
	C	15	N	—	—	—	—	—	—	
00047 50%	A	13	N	8.3	8.0	8.4	7.0	—	24.8	24.9
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00047 100%	A	13	N	8.8	7.7	8.5	7.1	—	24.7	25.1
	B	6	N	—	—	—	—	—	—	—
	C	11	3 Dead	—	—	—	—	—	—	—
00601 50%	A	15	N	8.0	7.9	8.5	7.0	—	24.8	25.0
	B	14	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00601 100%	A	15	N	8.3	8.0	8.7	7.2	—	24.6	25.0
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	

Comments:

Recorded by: MO
Date: 5/22/97
Time: 1045

Meter: SA290A — Meter: DO-1 — Meter: — — Meter: ES-5

Recorded by: MO
Date: 5/22/97
Time: 1015

[redacted]

AR300887

Aquatic Toxicology Department
Gainesville, Florida

Page:
QA Form: 053
Effective: October 1989

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston Test Substance: Surface water

Day: 6 Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
00602 50%	A	15	N	8.0	7.9	8.4	7.2	—	24.8	24.9
	B	14	N	—	—	—	—	—	—	—
	C	14	N	—	—	—	—	—	—	—
00602 100%	A	15	N	8.2	8.1	8.6	7.3	—	24.6	25.1
	B	14	1 Dead	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
00603 50%	A	8	N	7.9	8.0	8.4	7.3	—	24.7	25.1
	B	7	3 Dead	—	—	—	—	—	—	—
	C	11	1 Leth	—	—	—	—	—	—	—
00603 100%	A	12	N	8.1	8.2	8.6	7.2	—	24.6	25.2
	B	10	N	—	—	—	—	—	—	—
	C	12	N	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:	Recorded by: MJ	Meter: SA290A	Meter: DO 1	Meter: —	Meter: FS5
	Date: 5/27/97	Recorded by: MJ			
	Time: 1045	Date: 5/27/97		Time: 1015	

[redacted]

AR300888

Aquatic Toxicology Department
Gainesville, Florida

Page:
QA Form: 053
Effective: October 1989

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston Test Substance: Surface water
Day: 7 Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	—	7.8	—	7.0	—	—	24.2
	B	15	N	—	—	—	—	—	—	—
8	C	14	N	—	—	—	—	—	—	—
00046	A	15	N	—	8.0	—	7.1	—	—	24.2
	B	14	N	—	—	—	—	—	—	—
50%	C	15	N	—	—	—	—	—	—	—
00046	A	15	N	—	8.0	—	6.8	—	—	24.3
	B	14	N	—	—	—	—	—	—	
100%	C	15	N	—	—	—	—	—	—	—
00047	A	13	N	—	7.9	—	6.9	—	—	24.2
	B	15	N	—	—	—	—	—	—	—
50%	C	15	N	—	—	—	—	—	—	—
00047	A	12	1 Dead	—	7.7	—	6.8	—	—	24.2
	B	6	N	—	—	—	—	—	—	—
100%	C	10	1 Dead	—	—	—	—	—	—	—
00601	A	15	N	—	7.9	—	7.0	—	—	24.3
	B	14	N	—	—	—	—	—	—	—
50%	C	15	N	—	—	—	—	—	—	—
00601	A	15	N	—	8.0	—	6.9	—	—	24.4
	B	15	N	—	—	—	—	—	—	—
100%	C	15	N	—	—	—	—	—	—	

Comments:	Recorded by: MO	Meter: SA 720A	Meter: DO-1	Meter: —	Meter: FS-5
	Date: 5/28/97	Recorded by: MO			
	Time: 1415	Date: 5/28/97		Time: 1345	

Aquatic Toxicology Department
Gainesville, Florida

Page:
QA Form: 053
Effective: October 1989

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Weston
Test Substance: Surface water
Day: 7
Project Number: 3197225-0100

Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
00602	A	15	N	—	8.0	—	7.0	—	—	24.3
	B	14	N	—	—	—	—	—	—	—
50%	C	14	N	—	—	—	—	—	—	—
00602	A	15	N	—	8.1	—	6.8	—	—	24.4
	B	14	N	—	—	—	—	—	—	—
100%	C	15	N	—	—	—	—	—	—	—
00603	A	8	N	—	8.0	—	6.9	—	—	24.4
	B	5	2 Dead	—	—	—	—	—	—	—
50%	C	9	2 Dead	—	—	—	—	—	—	—
00603	A	12	N	—	8.1	—	6.9	—	—	24.4
	B	9	1 Dead	—	—	—	—	—	—	—
100%	C	9	3 Dead	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:	Recorded by: MO Date: 5/28/97 Time: 1915	Meter: SA290A	Meter: D01	Meter: —	Meter: ~~836~~
		Recorded by: MO	Date: 5/28/97		Time: 1345

AR300890

SUBJECT: FATHEAD MINNOW (PIMEPHALES PROMELAS) SHORT-TERM CHRONIC TOXICITY TEST--WEIGHT DATA

SPONSOR: Weston
TEST SUBSTANCE: Surface water
PROJECT NUMBER: 3197225-0100
DATE: 5/28-29/97
DATA BY: mo
TYPE/MODEL OF DRYING OVEN: Blue-M
OVEN TEMPERATURE (°C): 100
DRYING DURATION (HOURS): 18

TREATMENT LEVEL	REP.	A WEIGHT OF OVEN-DRIED PANS (~~mg~~) g	B WEIGHT OF PAN AND FRY (~~mg~~) g	B-A TOTAL DRY FRY WEIGHT (mg)	C NUMBER OF FRY WEIGHED	B-A/C AVERAGE DRY FRY WEIGHT (mg)	OBSERVATIONS
Control	A 1	0.9111	0.9172	6.1	15	0.41	
	B 2	0.9353	0.9420	6.7	15	0.45	Ctrl $\bar{x}$ = 0.44 mg
Control	C 3	0.9330	0.9394	6.4	14	0.46	
50% 00046	A 4	0.9312	0.9383	7.1	15	0.47	
50% 00046	B 5	0.9317	0.9388	7.1	14	0.51	50% 00046 $\bar{x}$ = 0.48
	C 6	0.9294	0.9362	6.8	15	0.45	
100% 00046	A 7	0.9312	0.9384	7.2	15	0.48	
	B 8	0.9329	0.9399	7.0	14	0.50	100% 00046 $\bar{x}$ = 0.48
100% 00046	C 9	0.9306	0.9377	7.1	15	0.47	
50% 00047	A 10	0.9273	0.9341	6.8	13	0.52	
50% 00047	B 11	0.9249	0.9319	7.0	15	0.47	50% 00047 $\bar{x}$ = 0.48
	C 12	0.9221	0.9290	6.9	15	0.46	

ES[illegible]ICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE:
ESE QA FORM: 052
EFFECTIVE: March 1986

SUBJECT: FATHEAD MINNOW (PIMEPHALES PROMELAS) SHORT-TERM CHRONIC TOXICITY TEST--WEIGHT DATA

SPONSOR: Weston
TEST SUBSTANCE: Surface water
PROJECT NUMBER: 3197225-0100
DATE: 5/28-29/97
DATA BY: MO
TYPE/MODEL OF DRYING OVEN: Blue M
OVEN TEMPERATURE (°C): 100
DRYING DURATION (HOURS): 18

TREATMENT LEVEL	REP.	A WEIGHT OF OVEN-DRIED PANS (~~mg~~) g	B WEIGHT OF PAN AND FRY (~~mg~~) g	B-A TOTAL DRY FRY WEIGHT (mg)	C NUMBER OF FRY WEIGHED	B-A/C AVERAGE DRY FRY WEIGHT (mg)	OBSERVATIONS
100% 00047	A 13	0.9382	0.9440	5.8	12	0.48	
	B 14	0.9343	0.9372	2.9	6	0.48	100% 00047 x̄ = 0.47
100% 00047	C 15	0.9203	0.9247	44	10	0.44	
50% 00601	A 16	0.9139	0.9200	6.1	MO 5/29/97 ~~13~~ 15	0.41	
50% 00601	B 17	0.9174	0.9245	7.1	14	0.51	50% 00601 x̄ = 0.47
	C 18	0.9298	0.9370	7.2	15	0.48	
100% 00601	A 19	0.9317	0.9387	7.0	15	0.47	
	B 20	0.9291	0.9371	8.0	15	0.53	100% 00601 x̄ = 0.48
100% 00601	C 21	0.9335	0.9401	6.6	15	0.44	
50% 00602	A 22	0.9358	0.9439	8.1	15	0.54	
50% 00602	B 23	0.9348	0.9420	7.2	14	0.48	50% 00602 x̄ = 0.52
	C 24	0.9275	0.9350	7.5	14	0.54	

AR300892

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ESE ECOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE:
ESE QA FORM: 052
EFFECTIVE: March 1986

SUBJECT: FATHEAD MINNOW (PIMEPHALES PROMELAS) SHORT-TERM CHRONIC TOXICITY TEST--WEIGHT DATA

SPONSOR: weston
TEST SUBSTANCE: Surface water
PROJECT NUMBER: 3197225-0100
DATE: 5/28-29/97
DATA BY: MP
TYPE/MODEL OF DRYING OVEN: Blue-M
OVEN TEMPERATURE (°C): 100
DRYING DURATION (HOURS): 18

TREATMENT LEVEL	REP.	A WEIGHT OF OVEN-DRIED PANS (~~mg~~) g	B WEIGHT OF PAN AND FRY (~~mg~~) g	B-A TOTAL DRY FRY WEIGHT (mg)	C NUMBER OF FRY WEIGHED	B-A/C AVERAGE DRY FRY WEIGHT (mg)	OBSERVATIONS
100% 00602	A 25	0.9210	0.9290	8.0	15	0.53	
	B 26	0.9189	0.9265	7.6	14	0.54	100% 00602 $\bar{x}$ = 0.53
100% 00602	C 27	0.9208	0.9285	7.7	15	0.51	
50% 00603	A 28	0.9217	0.9250	3.3	8	0.41	
50% 00603	B 29	0.9125	0.9148	2.3	5	0.46	50% 00603 $\bar{x}$ = 0.43
	C 30	0.9167	0.9205	3.8	9	0.42	
100% 00603	A 31	0.9124	0.9173	4.9	12	0.41	
	B 32	0.9132	0.9174	4.2	9	0.47	100% 00603 $\bar{x}$ = 0.43
100% 00603	C 33	0.9129	0.9167	3.8	9	0.42	

Appendix D: Reference Toxicant Test Data

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Reference Toxicant Control C-CHRONIC
Reference Toxicant: Potassium Chloride
Species: Ceriodaphnia dubia

Run by: MO
Date: 6/10/97

Test No.	Survival NOEC (mg/L)	Reproduction NOEC (mg/L)	Date
20	80	80	JUNE97
19	160	80	MAR97
18	80	80	JAN97
17	80	80	DEC96
16	80	80	OCT96
15	160	80	SEP96
14	160	80	JUL96
13	160	160	JUL96
12	160	80	APR96
11	160	40	MAR96
10	160	80	FEB96
9	80	80	JAN96
8	160	80	DEC95
7	80	80	OCT95
6	80	40	JUL95
5	80	20	APR95
4	80	40	FEB95
3	80	80	JAN95
2	80	80	OCT94
1	80	80	SEP94

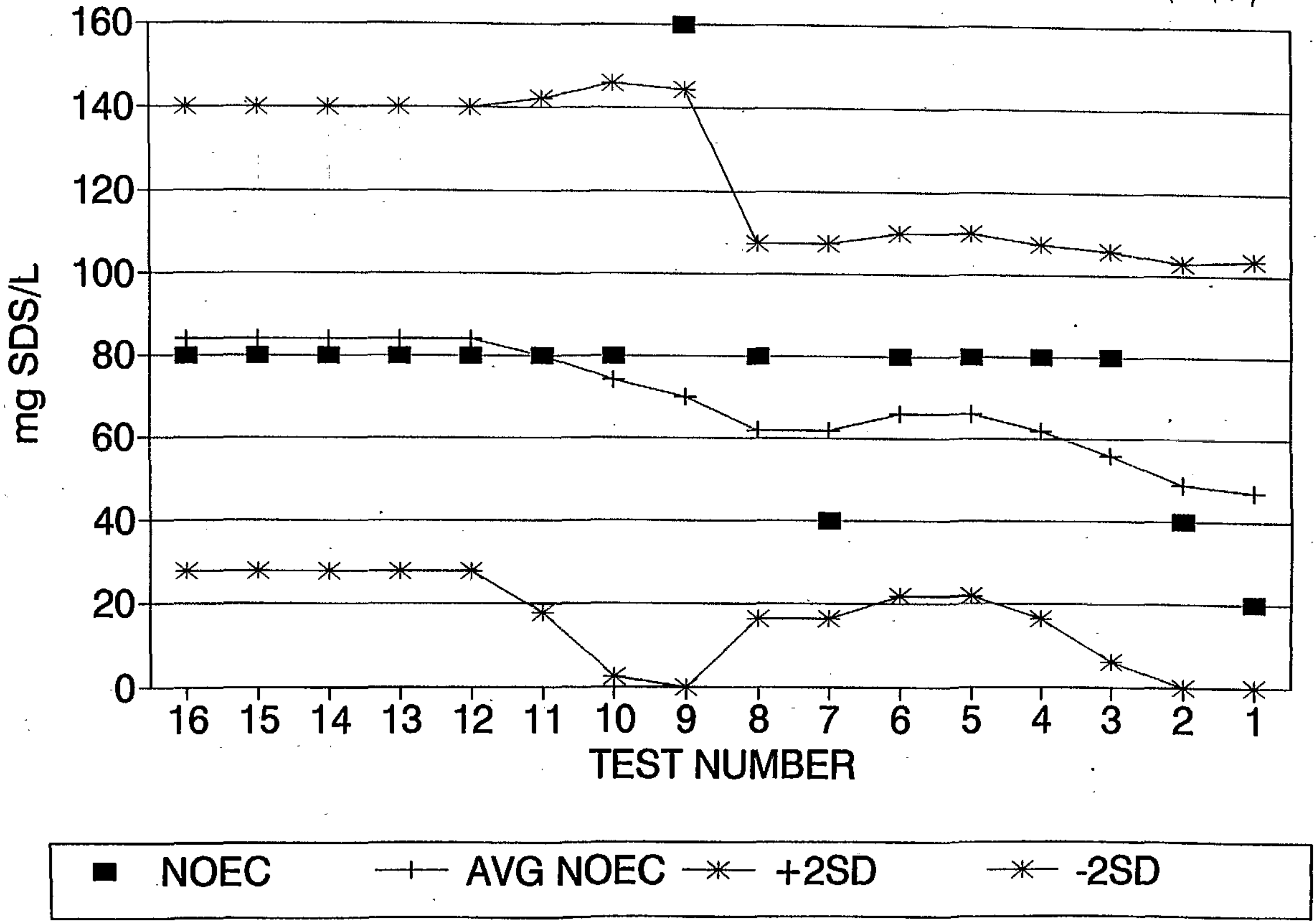
Average NOEC (Survival):	112 mg/L
Two x Standard Deviation (S):	78 mg/L
Average NOEC(repro):	75 mg/L
TwoxStandrd Deviation(repro)	53 mg/L

[redacted]

Chronic C. dubia Repro. Control Chart

Ref Tox: Potassium Chloride

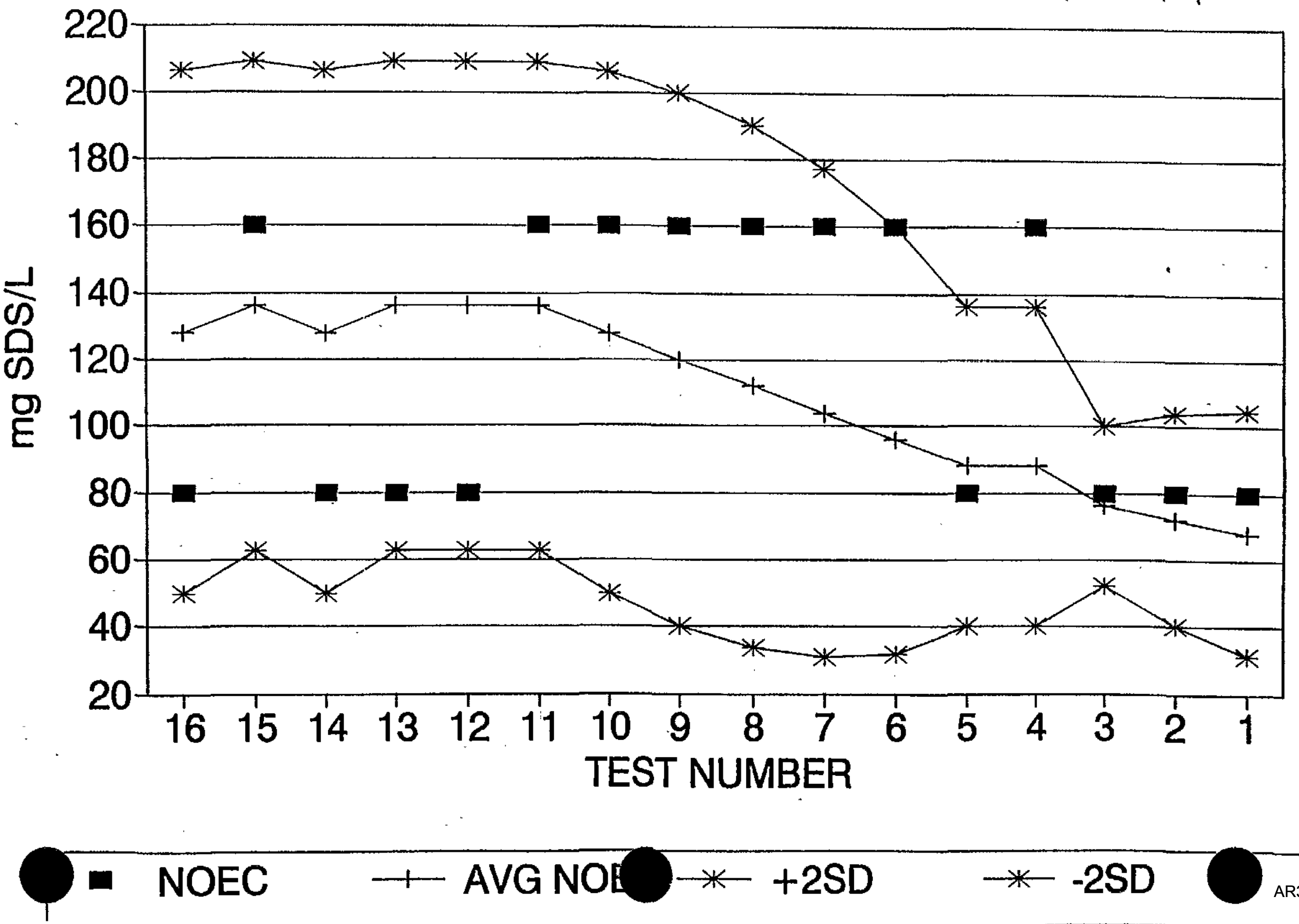
MO 6/10/97



Chronic C. dubia Survival Control Chart

Ref Tox: Potassium Chloride

MO 6/10/97



Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
ESE QA FORM: 056
EFFECTIVE: January, 1993

SUBJECT: CERIODAPHNIA CHRONIC TEST DATA

Sponsor: MBC Project No.: Ref Tox

Test Substance: KCl Test Species: Ceriodaphnia dubia

ANIMAL HISTORY

Lot No.: CCD060397 Date Neonates Collected: 6/3/97

Age of Neonates (hours): <24

See Page No. 62 of Cladoceran Neonate History Log Condition of Neonates: Normal

TEST CONDITIONS

Protocol: SOP-A-004

Dilution Water: 20% Perrier 80% Milli-Q Type Lighting: Fluorescent Photoperiod: 16 Hr L 8 Hr D

Test Container: 30 mL Plastic Beaker Solution Volume: 15 mL

TEST SOLUTION PREPARATION

Test Concentration (% mg/L)	CTRL	40	80	160	320	640
Amount of Effluent/Stock Added (mL)	—	8	16	32	64	128
Amount of Dilution Water Added (mL)	200	192	184	168	136	72
Test Solution Observations		KCl Stock →				

TEST VALIDITY CRITERIA

Number Young per Surviving Control Adult: 19.4

Percent of Surviving Control Adults with 3 Broods: 80%

TEST SUMMARY

Test (mg/L) Concentration	Number Young	Number Broods	Female Adults	# Young per Adult	# Broods per Adult
Control	194	28	10A, 0D	19.4	2.8
40	194	29	10A, 0D	19.4	2.9
80	190	29	10A, 0D	19.0	2.9
160	31	7	2A, 8D	3.1	0.7
320	0	0	0A, 10D	—	—
640	0	0	0A, 10D	—	—

ADDITIONAL COMMENTS: KCl Stock = 1.00 g KCl in 1000 mL of 20% Perrier.

Test Data Recorded By: MO Date: 6/3/97

Test Summary Recorded By: MO Date: 6/9/97

[redacted]

SUBJECT: CERIODAPHNIA CHRONIC TEST - WATER QUALITY

Sponsor: MISC.   Project No.: Ref Tox

Test Substance: KCl   Test Species: Ceriodaphnia dubia

Test Conc. (mg/L)	Parameter	Day 0	Day 1 New	Day 1 Old	Day 2 New	Day 2 Old	Day 3 New	Day 3 Old	Day 4 New	Day 4 Old	Day 5 New	Day 5 Old	Day 6 ~~New~~ OLD	Day 6 Old	Day 7 Old
Control	Temp.	24.6	24.6	24.7	24.7	24.6	24.8	24.5	24.7	24.5	24.8	24.3	24.2	—	
	D.O.	8.4	8.2	7.9	8.3	7.8	8.3	7.9	8.2	7.9	8.3	8.0	7.9	—	
	pH	7.9	7.8	7.8	7.8	7.9	7.7	7.8	7.7	7.8	7.7	7.8	7.9	—	
	Alk.	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Hard.	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Conduct.	175	175	—	170	—	170	—	170	—	170	—	—	—	
40	Temp.	24.6	24.6	24.6	24.7	24.5	24.8	24.4	24.7	24.5	24.8	24.2	24.2	—	
	D.O.	8.4	8.2	7.8	8.3	7.8	8.3	7.8	8.2	7.9	8.3	7.9	7.9	—	
	pH	7.9	7.8	7.9	7.8	7.9	7.5	7.8	7.5	7.9	7.7	7.9	8.0	—	
	Cond.	250	250	—	250	—	250	—	250	—	255	—	—	—	
80	Temp.	24.7	24.6	24.6	24.7	24.5	24.7	24.4	24.8	24.9	24.9	24.4	24.2	—	
	D.O.	8.4	8.2	7.8	8.3	7.8	8.3	7.8	8.2	7.8	8.3	7.9	7.9	—	
	pH	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.8	8.0	8.0	—	
	Cond.	325	330	—	325	—	330	—	330	—	325	—	—	—	
160	Temp.	24.6	24.6	24.7	24.8	24.5	24.7	24.3	24.9	24.9	24.9	24.3	24.1	—	
	D.O.	8.4	8.2	7.8	8.3	7.8	8.3	7.7	8.2	7.8	8.3	7.9	7.9	—	
	pH	8.0	7.9	8.0	8.0	8.0	7.9	8.0	8.0	8.0	7.9	8.0	8.0	—	
	Cond.	455	460	—	450	—	455	—	460	—	460	—	—	—	
320	Temp.	24.7	—	24.6											
	D.O.	8.4	—	7.7											
	pH	8.0	—	8.0											
	Cond.	800	—	—											
640	Temp.	24.7	—	24.5											
	D.O.	8.4	—	7.7											
	pH	8.1	—	8.0											
	Cond.	1325	—	—											
—	Temp.														
	D.O.														
	pH														
	Alk.														
	Hard.														
	Conduct.														

Temp. Device	FS5	FS-5	FS-5	FS-5	FS-5	FS-5	FS-5	
pH Meter	SA290A	SA290A	SA290A	SA290A	SA290A	SA290A	SA290A	
D.O. Meter	DO-1	DO-1	DO-1	DO-1	DO-1	DO-1	DO-1	
Hard. Method	—	—	—	—	—	—	—	
Alk. Method	—	—	—	—	—	—	—	
Conductivity Meter	SCT 3	SCT 3	SCT 3	SCT 3	SCT 3	SCT 3	S—	
INITIALS:	MO	MO	MO	MO	MO	MO	MO	
DATE:	6/3/97	6/4/97	6/5/97	6/6/97	6/7/97	6/8/97	6/9/97	
TIME:	1115	1115	1430	1330	1245	1115	1400	

Hard/Alk = mg/L as $CaCO_3$
Temp. = °C
D.O. = mg/L
Conduct. = umhos/cm

Temperature was continuously recorded on channel of the SCM temperature monitor.

[redacted]

ESE TOXICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE:
ESE QA FORM: 054
EFFECTIVE: April, 1986

SUBJECT: CERIODAPHNIA CHRONIC TEST - SURVIVAL

Sponsor: MBG Project No.: Ref Tox

Test Substance: KCl Test Species: Ceriodaphnia dubia

Test Conc. (mg/L)	Day	1 AD	1 N*	2 AD	2 N	3 AD	3 N	4 AD	4 N	5 AD	5 N	6 AD	6 N	7 AD	7 N	8 AD	8 N	9 AD	9 N	10 AD	10 N
Control	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	0	A	3	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	4	A	4	A	4	A	2	A	4	A	3	A	3	A	4	A	4	A	4	A	3
	5	A	8	A	10	A	8	A	1	A	8	A	8	A	8	A	4	A	6	A	8
	6	A	8	A	0	A	10	A	9	A	10	A	9	A	12	A	10	A	9	A	10
	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	T		20		17		20		14		21		20		24		18		19		21
40	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	4
	4	A	3	A	4	A	3	A	2	A	3	A	4	A	3	A	4	A	4	A	0
	5	A	7	A	7	A	7	A	7	A	6	A	8	A	4	A	6	A	8	A	7
	6	A	8	A	9	A	11	A	11	A	10	A	9	A	6	A	8	A	11	A	10
	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	T		18		20		21		20		19		21		13		18		23		21
80	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0
	3	A	0	A	3	A	0	A	0	A	0	A	3	A	4	A	0	A	0	A	0
	4	A	3	A	0	A	4	A	3	A	4	A	1	A	0	A	5	A	4	A	2
	5	A	5	A	6	A	7	A	4	A	6	A	7	A	7	A	5	A	10	A	0
	6	A	10	A	7	A	11	A	12	A	12	A	7	A	13	A	10	A	10	A	5
	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	T		18		16		22		19		22		18		24		20		24		7
160	1	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	D	0	D	0
	2	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0				
	3	A	0	D	0	D	0	A	0	A	0	A	0	A	0	D	0				
	4	A	3					D	3	A	4	D	4	A	3						
	5	A	0							A	7			A	7						
	6	D	0							A	0			A	0						
	7	—	—							—	—			—	—						
	T		3		—		—		3		11		4		10				—		—
320	1	D	0	D	0	D	0	D	0	D	0	D	0	D	0	D	0	D	0	D	0
	2																				
	3																				
	4																				
	5																				
	6																				
	7																				

	DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6			
INITIALS:	MO	MO	MO	MO	MO	MO	MO			
DATE:	6/3/97	6/4/97	6/5/97	6/6/97	6/7/97	6/8/97	6/9/97			
TIME:	1130	1130	1500	1345	1300	1130	1430			

*Number of neonates recorded for day observed; not cumulative.

AD = Adult
N = Neonate
A = Alive

[redacted]

AR300900

SUBJECT: CERIODAPHNIA CHRONIC TEST - SURVIVAL

Sponsor: Misc. Project No.: Ref Tox

Test Substance: KCl Test Species: Ceriodaphnia dubia

Test Conc. (mg/L)	Day	Replicate 1 AD	1 N*	2 AD	2 N	3 AD	3 N	4 AD	4 N	5 AD	5 N	6 AD	6 N	7 AD	7 N	8 AD	8 N	9 AD	9 N	10 AD	10 N
640	1	D	0	D	0	D	0	D	0	D	0	D	0	D	0	D	0	D	0	D	0
	2																				
	3																				
	4																				
	5																				
	6																				
	7																				
	1																				
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	2																				
	3																				
	4																				
	5																				
	6																				
	7																				

	DAY 0	DAY 1	DAY 2								
INITIALS:	MO	MO									
DATE:	6/3/97	6/4/97									
TIME:	1130	1130									

*Number of neonates recorded for day observed; not cumulative.

AD = Adult
N = Neonate
A = Alive

[redacted]

mo 6/10/97 C. dubia survival - KCl

FISHER'S EXACT TEST

	NUMBER OF		
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
40 mg/L	10	0	10
TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference
tween CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

	NUMBER OF		
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
80 mg/L	10	0	10
TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference
tween CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

	NUMBER OF		
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
160 mg/L	2	8	10

[redacted]

MO 6/10/97

	TOTAL	12	8	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 2.
Since b is less than or equal to 6 there is a significant difference between CONTROL and TREATMENT at the 0.05 level.

C. dubia survival

SUMMARY OF FISHER'S EXACT TESTS

;ROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)
	CONTROL	10	0	
1	40 mg/L	10	0	
2	80 mg/L	10	0	
3	160 mg/L	10	8	*

:hronic Reference Toxicant (KCl) - C. dubia reprod.
'ile: rtcr Transform: NO TRANSFORMATION

:hapiro - Wilk's test for normality

) = 354.800

/ = 0.887

'ritical W (P = 0.05) (n = 30) = 0.927
'ritical W (P = 0.01) (n = 30) = 0.900

›ata FAIL normality test. Try another transformation.

arning - The first three homogeneity tests are sensitive to non-normal data and should not be performed.

hronic Reference Toxicant (KCl) - C. dubia reprod.
ile: rtcr Transform: NO TRANSFORMATION

artlett's test for homogeneity of variance
alculated B1 statistic = 4.69

able Chi-square value = 9.21 (alpha = 0.01, df = 2)
˙˙le Chi-square value = 5.99 (alpha = 0.05, df = 2)

ata PASS B1 homogeneity test at 0.01 level. Continue analysis.

[redacted]

ronic Reference Toxicant (KCl) - C. dubia reprod. MO 6/10/97
ile: rtcr Transform: NO TRANSFORMATION

STEEL'S MANY-ONE RANK TEST - Ho:Control<Treatment

ROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	Control	19.400				
2	40 mg/L	19.400	107.50	79.00	10.00	
3	80 mg/L	19.000	107.00	79.00	10.00	

Critical values use k = 2, are 1 tailed, and alpha = 0.05

[redacted] [redacted]
AR300904

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Reference Toxicant Control C CHRONIC
Reference Toxicant: Potassium chloride (KCl)
Species: Pimephales promelas

Run by: MD
Date: ~~6/10/97~~ 6/11/97
MD 6/11/97
(WS)

Test No.	Survival NOEC (mg/L)	Growth NOEC (mg/L)	Date
20	500	500	Jun97
19	500	500	Mar97
18	500	500	Jan97
17	500	500	Dec96
16	500	500	Oct96
15	500	500	Sep96
14	500	500	Jul96
13	500	500	Jul96
12	500	500	Apr96
11	500	500	Mar96
10	500	500	Feb96
9	500	500	Jan96
8	500	500	Dec95
7	500	500	Oct95
6	500	500	Jul95
5	500	500	Apr95
4	500	500	Feb95
3	500	500	Oct94
2	500	500	Sep94
1	500	500	Aug94

Average NOEC(Surv):	500 mg/L
Two x Standard Dev. (SURV.)	0 mg/L
Average NOEC(Growth):	500 mg/L
Two x Standard Dev.(GROW.	0 mg/L

Note: Control chart is not available due to no deviations from average.

[redacted]

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
QA FORM: 051
EFFECTIVE: JAN 1993

SUBJECT: FATHEAD MINNOW SHORT-TERM CHRONIC TOXICITY TEST

SPONSOR: MIBC   PROJECT NUMBER: Ref Tox

TEST EFFLUENT: Potassium chloride (KCl)   TEST SPECIES: Pimephales promelas

ANIMAL HISTORY

SOURCE OF LARVAE: Florida Bioassay Supply   DATE OF HATCH: 6/03/97

LARVAE LOT NO.: 97-39   CONDITION OF LARVAE: Normal

SEE PAGE NO.: 77 OF ANIMAL RECEIPT LOG

SEE PAGE NO.: 139 OF FISH HOLDING LOG FOR RAW DATA ON LARVAE HISTORY

TEST CONDITIONS

TEST CONTAINER DIAMETER: 100 mm HEIGHT: 50 mm	TEST SOLUTION HEIGHT: 40 mm	TEST CHAMBER VOLUME: 340 mL	TEST SOLUTION VOLUME: 250 mL	TEST CONTAINER COMPOSITION: GLASS

PROTOCOL: SOP-A-004   TYPE LIGHTING: Fluorescent   PHOTOPERIOD: 16 Hr L 8 Hr D

DILUTION WATER: Moderately Hard Reconstituted water

EFFLUENT DATA FOUND ON PAGE NO.: ___ OF EFFLUENT LOG

TEST SOLUTIONS SPLIT INTO 3 EQUAL AMOUNTS

TEST CONCENTRATION (~~% effluent~~) (mg/L KCl) MO 5/14/97	CON-TROL	250	500	1000	2000	4000	
VOLUME OF ~~EFFLUENT~~ ADDED (mL) KCl Stock	NA	18.8	37.5	75	150	300	
VOLUME OF DILUTION WATER (mL)	750	731.2	712.5	675	600	450	

ADDITIONAL COMMENTS: KCl Stock = 10.0 g KCl in 1000 ml of mod hard recon water.

DATA RECORDED BY: MO   DATE: 6/03/97

FORM: FHMCHR1

[redacted]

AR300906

Aquatic Toxicology Department
Gainesville, Florida

Page:
QA Form: 053
Effective: October 1989

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: MISC
Test Substance: KCl
Day: 0
Project Number: Ref Tox

(mg/L) Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	~	7.9	—	8.4	—	280	24.4	—
	B	15	~	—	—	—	—	—	—	—
	C	15	~	—	—	—	—	—	—	—
250	A	15	~	7.9	—	8.4	—	800	24.4	—
	B	15	~	—	—	—	—	—	—	—
	C	15	~	—	—	—	—	—	—	—
500	A	15	~	8.0	—	8.4	—	1250	24.4	—
	B	15	~	—	—	—	—	—	—	—
	C	15	~	—	—	—	—	—	—	—
1000	A	15	~	8.1	—	8.4	—	2100	24.4	—
	B	15	~	—	—	—	—	—	—	—
	C	15	~	—	—	—	—	—	—	—
2000	A	15	~	8.2	—	8.4	—	3700	24.5	—
	B	15	~	—	—	—	—	—	—	—
	C	15	~	—	—	—	—	—	—	—
4000	A	15	~	8.2	—	8.4	—	8000	24.5	—
	B	15	~	—	—	—	—	—	—	—
	C	15	~	—	—	—	—	—	—	—
	A									
	B									
	C									

Comments:

Recorded by: MD
Date: 6/3/97
Time: 1200

Meter: SA290A
Meter: DO-1
Meter: SCT-3
Meter: F66

Recorded by: MD
Date: 6/3/97
Time: 1115

[redacted]

AR300907

Aquatic Toxicology Department
Gainesville, Florida

Page:
QA Form: 053
Effective: October 1989

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: MBC. Test Substance: KCl
Day: 1 Project Number: Ref Tox

(mg/L) Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	7.8	7.7	8.4	7.5	275	24.4	24.5
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
250	A	15	N	7.9	7.6	8.4	7.4	800	24.4	24.6
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
500	A	15	N	7.9	7.6	8.4	7.5	1225	24.4	24.6
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
1000	A	12	3 Dead	8.0	7.8	8.4	7.5	2100	24.5	24.6
	B	9	6 Dead	—	—	—	—	—	—	—
	C	8	7 Dead	—	—	—	—	—	—	—
2000	A	2	13 Dead	8.2	8.0	8.4	7.4	3700	24.5	24.7
	B	2	13 Dead	—	—	—	—	—	—	—
	C	1	14 Dead	—	—	—	—	—	—	—
4000	A	0	15 Dead	—	8.1	—	7.4	—	—	24.7
	B	0	15 Dead	—	—	—	—	—	—	—
	C	0	15 Dead	—	—	—	—	—	—	—
	A									
	B									
	C									

Comments:	Recorded by: MO Date: 6/4/97 Time: 1145	Meter: SA290A	Meter: DO-1	Meter: SCT-3	Meter: FS-5
		Recorded by: MO Date: 6/4/97		Time: 1115	

[redacted]

Aquatic Toxicology Department
Gainesville, Florida

Page:
QA Form: 053
Effective: October 1989

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: MIBC. Test Substance: KCl
Day: 2 Project Number: Ref Tox

(mg/L) Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	7.9	7.6	8.4	7.4	280	24.6	24.3
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
250	A	15	N	7.9	7.6	8.4	7.5	800	24.6	24.3
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
500	A	15	N	8.0	7.7	8.4	7.5	1250	24.6	24.2
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
1000	A	7	5 Dead 3 Leth	8.1	7.9	8.4	7.6	2100	24.6	24.1
	B	3	6 Dead 1 Leth	—	—	—	—	—	—	—
	C	4	4 Dead 2 Leth	—	—	—	—	—	—	—
2000	A	0	2 Dead	—	8.0	—	7.7	—	—	24.0
	B	0	2 Dead	—	—	—	—	—	—	—
	C	0	1 Dead	—	—	—	—	—	—	—
4000	A	—	—	—	—	—	—	—	—	—
	B	—	—	—	—	—	—	—	—	—
	C	—	—	—	—	—	—	—	—	—
	A									
	B									
	C									

Comments:	Recorded by: MO	Meter: SA290A	Meter: DO1	Meter: SCT-3	Meter: FS-5
	Date: 6/5/97 Time: 1500	Recorded by: MO Date: 6/5/97		Time: 1430	

[redacted]

AR300909

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: MISC.   Test Substance: KCl

Day: 3   Project Number: Ref TOX

(mg/L) Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	~	7.9	7.7	8.5	7.3	280	24.4	24.2
	B	15	~	—	—	—	—	—	—	—
	C	15	~	—	—	—	—	—	—	—
250	A	15	~	7.9	7.6	8.5	7.5	790	24.4	24.2
	B	15	~	—	—	—	—	—	—	—
	C	15	~	—	—	—	—	—	—	—
500	A	15	~	8.0	7.8	8.4	7.2	1250	24.3	24.1
	B	15	~	—	—	—	—	—	—	—
	C	15	~	—	—	—	—	—	—	—
1000	A	2	2 leth 5 dead	8.1	7.9	8.4	7.8	2080	24.3	24.2
	B	3	2 leth	—	—	—	—	—	—	—
	C	1	3 dead 1 leth	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:	Recorded by: MO Date: 6/6/97 Time: 1400	Meter: SA290A	Meter: DO-1	Meter: SCT-3	Meter: FS-5
		Recorded by: MO	Date: 6/6/97	Time: 1330	

[redacted]

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Misc. Test Substance: KCl

Day: 4 Project Number: Ref Tox

(mg/L) Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	7.8	7.6	8.4	7.4	280	24.6	24.5
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
250	A	15	N	7.8	7.7	8.4	7.4	790	24.6	24.6
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
500	A	15	N	7.9	7.8	8.4	7.5	1240	24.6	24.6
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	
1000	A	2	N	8.0	7.8	8.4	8.0	2100	24.6	24.7
	B	2	1 Dead	—	—	—	—	—	—	—
	C	0	1 Dead	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:	Recorded by: MO Date: 6/7/97 Time: 1315	Meter: SA 290A	Meter: DO-1	Meter: SCT-3	Meter: FS-8
		Recorded by: MO Date: 6/7/97		Time: 1245	

[redacted]

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: MBC Test Substance: KCl

Day: 5 Project Number: Ref Tox

(mg/L) Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	7.9	7.7	8.4	7.3	280	24.5	24.6
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
250	A	15	N	7.9	7.7	8.4	7.2	800	24.5	24.7
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
500	A	15	N	8.0	7.8	8.4	7.4	1250	24.6	24.7
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
1000	A	0	2 Dead	8.1	8.0	8.4	7.8	2080	24.6	24.8
	B	1	1 Dead	—	—	—	—	—	—	—
	C	—	—	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:	Recorded by: MO Date: 6/8/97 Time: 1200	Meter: SA290A	Meter: DO-1	Meter: SCT-3	Meter: FS-5
		Recorded by: MO		Time: 1115	
		Date: 6/8/97			

[redacted]

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Misc. Test Substance: KCl

Day: 6 Project Number: Ref Tox

(mg/L) Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	8.0	7.8	8.4	7.2	275	24.4	24.2
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
250	A	15	N	8.0	7.9	8.4	7.0	800	24.4	24.1
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
500	A	14	1 Dead	8.1	8.0	8.4	7.2	1225	24.5	24.2
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
1000	A	—	—	8.1	8.0	8.4	8.0	2080	24.4	24.3
	B	1	N	—	—	—	—	—	—	—
	C	—	—	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:	Recorded by: MO Date: 6/9/97 Time: 1415	Meter: SA 290A	Meter: DO-1	Meter: SCG-3	Meter: FS-5
		Recorded by: MO Date: 6/9/97		Time: 1400	

[redacted]

Aquatic Toxicology Department
Gainesville, Florida

Page:
QA Form: 053
Effective: October 1989

SUBJECT: P. promelas SHORT-TERM CHRONIC TOXICITY TEST

Sponsor: Misc. Test Substance: KCl

Day: 7 Project Number: Ref Tox

(mg/L) Treatment	Rep #	# Alive	Observ	pH New	pH Old	DO (mg/L) New	DO (mg/L) Old	Cond (umhos) New	Temp (C) New	Temp (C) Old
Control	A	15	N	—	7.7	—	7.4	—	—	25.3
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
250	A	15	N	—	7.8	—	7.5	—	—	25.4
	B	15	N	—	—	—	—	—	—	—
	C	15	N	—	—	—	—	—	—	—
500	A	14	N	—	7.9	—	7.6	—	—	25.5
	B	15	N	—	—	—	—	—	—	—
	C	14	1 Dead	—	—	—	—	—	—	—
1000	A	—	—	—	8.1	—	8.0	—	—	25.5
	B	1	N	—	—	—	—	—	—	—
	C	—	—	—	—	—	—	—	—	—
	A									
	B									
	C									
	A									
	B									
	C									
	A									
	B									
	C									

Comments:	Recorded by: MO Date: 6/10/97 Time: 1100	Meter: SA250A	Meter: DO-1	Meter: —	Meter: FS-5
		Recorded by: MO Date: 6/10/97		Time: 1045	

[redacted]

AR300914

01 /86

ESE ICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE:
ESE QA FORM: 052
EFFECTIVE: March 1986

SUBJECT: FATHEAD MINNOW (PIMEPHALES PROMELAS) SHORT-TERM CHRONIC TOXICITY TEST--WEIGHT DATA

SPONSOR: MBC
TEST SUBSTANCE: KCl
PROJECT NUMBER: Ref Tox
DATE: 6/10-11/97
DATA BY: MO
TYPE/MODEL OF DRYING OVEN: Blue-M
OVEN TEMPERATURE (°C): 100
DRYING DURATION (HOURS): ~18

(mg/L) TREATMENT LEVEL	REP.	A WEIGHT OF OVEN-DRIED PANS (mg) g	B WEIGHT OF PAN AND FRY ~~(mg)~~ g	B-A TOTAL DRY FRY WEIGHT (mg)	C NUMBER OF FRY WEIGHED	B-A/C AVERAGE DRY FRY WEIGHT (mg)	OBSERVATIONS
Control	A 1	0.9244	0.9305	6.1	15	0.41	
	B 2	0.9242	0.9307	6.5	15	0.43	control $\bar{X}$ = 0.43 mg
Control	C 3	0.9273	0.9340	6.7	15	0.45	
250	A 4	0.9240	0.9311	7.1	15	0.47	
250	B 5	0.9240	0.9303	6.3	15	0.42	250 $\bar{X}$ = 0.44 mg
	C 6	0.9270	0.9336	6.6	15	0.44	
500	A 7	0.9290	0.9357	6.7	14	0.48	
	B 8	0.9283	0.9353	7.0	15	0.47	500 $\bar{X}$ = 0.48 mg
500	C 9	0.9279	0.9347	6.8	14	0.49	
1000	B 10	0.9222	0.9226	0.4	1	0.40	

AR300915

vtes P. promelas--survival data
ile: a:avtex.1 Transform: NO TRANSFORMATION

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	8	75.630	9.454	6.717
ithin (Error)	18	25.333	1.407	
otal	26	100.963		

Critical F value = 2.51 (0.05,8,18)
Since F > Critical F REJECT Ho: All equal

[redacted]

Avtes P. promelas--survival data
File: a:avtex.1 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	14.667	14.667		
2	50% 45	14.667	14.667	0.000	
3	100% 46	14.667	14.667	0.000	
4	50% 47	14.333	14.333	0.344	
5	100% 47	9.333	9.333	5.506	*
6	50% 601	14.667	14.667	0.000	
7	100% 601	15.000	15.000	-0.344	
8	50% 602	14.333	14.333	0.344	
9	100% 602	14.667	14.667	0.000	

Dunnett table value = 2.58 (1 Tailed Value, P=0.05, df=18,8)

Avtes P. promelas--survival data
File: a:avtex.1 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	3			
2	50% 45	3	2.499	17.0	0.000
3	100% 46	3	2.499	17.0	0.000
4	50% 47	3	2.499	17.0	0.333
5	100% 47	3	2.499	17.0	5.333
6	50% 601	3	2.499	17.0	0.000
7	100% 601	3	2.499	17.0	-0.333
8	50% 602	3	2.499	17.0	0.333
9	100% 602	3	2.499	17.0	0.000

[redacted]

vtex P. promelas survival
ile: a:avtex.2 Transform: NO TRANSFORMATION

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	2	82.667	41.333	16.174
ithin (Error)	6	15.333	2.556	
otal	8	98.000		

Critical F value = 5.14 (0.05,2,6)
Since F > Critical F REJECT Ho: All equal

[redacted]

Avtex P. promelas survival
File: a:avtex.2 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	14.667	14.667		
2	50% 603	7.333	7.333	5.618	*
3	100% 603	10.000	10.000	3.575	*

Dunnett table value = 2.34 (1 Tailed Value, P=0.05, df=6,2)

Avtex P. promelas survival
File: a:avtex.2 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	3			
2	50% 603	3	3.054	20.8	7.333
3	100% 603	3	3.054	20.8	4.667

[redacted]

ɾtex P. promelas growth
ile: a:avtex.3 Transform: NO TRANSFORMATION

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	2	0.000	0.000	0.156
ithin (Error)	6	0.005	0.001	
otal	8	0.005		

Critical F value = 5.14 (0.05,2,6)
Since F < Critical F FAIL TO REJECT Ho: All equal

[redacted]

Avtex P. promelas growth
File: a:avtex.3 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	0.440	0.440		
2	50% 603	0.427	0.427	0.558	
3	100% 603	0.433	0.433	0.279	

Dunnett table value = 2.34 (1 Tailed Value, P=0.05, df=6,2)

Avtex P. promelas growth
File: a:avtex.3 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	3			
2	50% 603	3	0.056	12.7	0.013
3	100% 603	3	0.056	12.7	0.007

[redacted]

vtes P. promelas--growth data
ile: a:\avtex.4 Transform: NO TRANSFORM

ANOVA TABLE

ɔURCE	DF	SS	MS	F
ɜtween	8	0.017	0.002	2.006
ithin (Error)	18	0.019	0.001	
ɔtal	26	0.036		

Critical F value = 2.51 (0.05,8,18)
Since F < Critical F FAIL TO REJECT Ho: All equal

[redacted]

Avtes P. promelas--growth data
File: a:\avtex.4 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	0.440	0.440		
2	50% 45	0.477	0.477	-1.375	
3	100% 46	0.483	0.483	-1.625	
4	50% 47	0.483	0.483	-1.625	
5	100% 47	0.467	0.467	-1.000	
6	50% 601	0.467	0.467	-1.000	
7	100% 601	0.480	0.480	-1.500	
8	50% 602	0.520	0.520	-3.000	
9	100% 602	0.527	0.527	-3.250	

Dunnett table value = 2.58 (1 Tailed Value, P=0.05, df=18,8)

Avtes P. promelas--growth data
File: a:\avtex.4 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	3			
2	50% 45	3	0.069	15.6	-0.037
3	100% 46	3	0.069	15.6	-0.043
4	50% 47	3	0.069	15.6	-0.043
5	100% 47	3	0.069	15.6	-0.027
6	50% 601	3	0.069	15.6	-0.027
7	100% 601	3	0.069	15.6	-0.040
8	50% 602	3	0.069	15.6	-0.080
9	100% 602	3	0.069	15.6	-0.087

[redacted]

FINAL REPORT:

TOXICITY ASSESSMENT OF SEDIMENTS FROM AVTEX FIBERS, FRONT ROYAL, VIRGINIA, WITH THE FRESHWATER INVERTEBRATES, *HYALELLA AZTECA AND CHIRONOMUS TENTANS*

TEST GUIDELINE:

EPA/600/R-94/024

PREPARED FOR:

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STUDY ID:

Roy F. Weston Project No. 3347-041-001-1215
QST Project No. 3197225-0100-3100

September 1997

[redacted]

EXECUTIVE SUMMARY

Whole sediment toxicity tests were conducted at QST Environmental Inc. (formerly Environmental Science & Engineering, Inc) in Gainesville, Florida, with the freshwater amphipod, *Hyalella azteca*, and the midge, *Chironomus tentans*, on samples collected from the Avtex Fibers Superfund Site, Front Royal, Virginia. A total of 11 site sediments, one field reference sediment, and one laboratory control sediment were used in the toxicity tests. After 10 days of exposure, there were no significant differences (P=0.05) in the survival and growth of *Hyalella azteca* between the laboratory control sediment and the Reference No. 2 sediment from sample station 11-215-00410. Survival of *Hyalella azteca* in the laboratory control and Reference No. 2 sediments was significantly different (P=0.05) from survival in sediments from sample stations 11-215-00044, 11-215-00606 and 11-215-00608. Growth of *Hyalella azteca* in the Reference No. 2 sediment was significantly different (P=0.05) from growth in sediments from sample stations, 11-21-00044 and 11-215-00606. Growth of *Hyalella azteca* in sample 11-215-00044 could not be determined due to 100 percent mortality. After 10 days of exposure, there were no significant differences (P=0.05) in the survival of *Chironomus tentans* between the laboratory control sediment and the Reference No. 2 sediment. Survival of *Chironomus tentans* in the Reference No. 2 sediment was significantly different (P=0.05) from survival in sediments from sample station 11-215-00606 and 11-215-00044. Finally, growth of *Chironomus tentans* in the Reference No. 2 sediment was significantly different (P=0.05) from growth in laboratory control sediment, and sediments from sample station 11-215-00044, 11-215-00045, and 11-215-00606. Percent organic matter of the sediment samples used in the toxicity tests ranged from 1.0 percent (11-21-00403) to 32.6 percent (11-215-00044). Laboratory control and Reference No. 2 sediments percent organic matter were <0.5 percent and 4.0 percent, respectively.

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1.0 INTRODUCTION

Whole sediment toxicity tests were conducted at QST Environmental Inc. (formerly Environmental Science & Engineering, Inc.) with sediment samples collected from the Avtex Fibers Superfund Site, Front Royal, Virginia, to determine the relative toxicities of the test samples. The test organisms used for toxicity tests was the freshwater amphipod, *Hyalella azteca* and the midge, *Chironomus tentans*. The effect criteria for the toxicity tests were survival and growth (measured as dry weight and/or length).

The tests were conducted following EPA Guideline EPA/600/R-94/024 entitled: *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates* (EPA, 1994), Roy F. Weston, Inc. test guidelines, and QST in-house standard operating procedures. All of the original raw data pertaining to this study are maintained at QST, 404 SW 140th Street, Newberry, Florida 32669-3000.

2.0 MATERIALS AND METHODS

2.1 TEST SAMPLES

Test sediments were collected from the Avtex Fibers Superfund Site, Front Royal, Virginia, by Roy F. Weston, Inc. personnel on May 13 through 15, 1997, and were received on ice at the QST Gainesville laboratory on May 15 through 17, 1997. The test samples, identified as 11-215-00044, 11-215-00045, 11-215-00402, 11-215-00403, 11-215-00404, 11-215-00405, 11-215-00407, 11-215-00410 (field reference), 11-215-00605, 11-215-00606, 11-215-00607, and 11-215-00608, were received in quantities of approximately 4 kilograms (4 x 1 Kg) each. Additional samples were received in 8 ounce glass containers for organic matter determination. The locations of the above samples are cross-referenced in the tables at the end of this report. Upon receipt, the coolers were opened and the contents checked against the chain-of-custody sheets to ensure that all the recorded samples were present. The temperature of representative samples was measured because no temperature blanks were provided in the coolers. Any observations made during the sample receipt and log-in operations were recorded in the sample receipt logbook.

The laboratory control sediment used for the whole sediment bioassays was collected by QST personnel from Marineland, Florida. The site from which the laboratory control sediment was collected has been proven to be uncontaminated in previous tests. Chain-of-custody and other traffic information pertaining to the samples are presented in Appendix A. All samples were stored in a refrigerator at 4 ± 2 °C during the testing period.

2.2 OVERLYING WATER

The water used as dilution or overlying water for the *H. azteca* tests was hard freshwater with a hardness of approximately 138 mg/L as $CaCO_3$. The water was obtained from a deep well located at the test site and was diluted with deionized water to achieve the desired hardness. Overlying water for the *C. tentans* tests was reconstituted freshwater with a hardness of approximately 79 mg/L as $CaCO_3$.

2.3 TEST ORGANISMS

The tests were conducted using juvenile (second or third instar, 2-3 mm long) *H. azteca* and seco or third instar *C. tentans*. *H. azteca* were obtained from Chesapeake Cultures, Hayes, VA and *C. tentans* were obtained from Aquatic Biosystems, Fort Collins, CO. The suppliers' breeding and holding conditions, such as temperature and water hardness, were similar to those of the testing conditions. The test organisms were held approximately 24 hours in the laboratory prior to use in testing. Test organisms were acclimated to any differences in water chemistry by diluting the receiving water with test dilution water to 50 percent of receiving water. All *H. azteca* and *C. tentans* used in the tests appeared to be normal and healthy at test initiation.

2.4 TEST DESIGN

Prior to use in testing, the sediment samples were thoroughly homogenized in glass sorting pans to remove stones, plant debris, and indigenous organisms. Sediments were then pressed sieved through a 0.5 mm mesh screen to remove any indigenous organisms. Any observations made during the homogenization and sieving processes were recorded on a daily log sheet. The test vessels used for the bioassays were 470 mL glass jars (13 cm height and 7 cm diameter).

[redacted]

Approximately 100 grams of test, field reference, or laboratory control sediment were introduced into the test chambers and uniformly leveled. One-hundred and seventy-five milliliters (175 mL) of overlying water were added to each test chamber to provide a ratio of 1 part sediment to 1.75 parts overlying water. The test chambers were then allowed to settle overnight without aeration. After the settling period, the overlying water was renewed and the initial water quality measurements were taken prior to loading the test organisms.

The test organisms were randomly added to the individual test vessels, loading only one replicate at a time until loading was complete. The whole sediment tests were conducted using eight replicates of ten organisms per replicate for a total of 80 *H. azteca* and 80 *C. tentans* per sample. The test vessels were labeled with the site sample number and the replicate number (A through H), and the test area was identified by the project manager, project number, test type and schedule.

The duration of the static-renewal test was 10 days during which the overlying water in each replicate exposure chamber was renewed twice daily. During renewals, approximately 75 percent of the overlying water was siphoned through a 0.1 mm mesh sieve. Any test organisms trapped in the sieve were pipetted back into the appropriate test chamber. New overlying water was then slowly added to the test chamber while diverting the flow onto the side of the test chamber to minimize resuspension of the sediments. *Hyalella azteca* were fed 1.5 mL per replicate of yeast/trout chow/cereal leaves mixture (Aquatic Biosystems, Fort Collins, Colorado) daily, supplemented with 1 feeding of rabbit chow and algae. *Chironomus tentans* were fed tetramin (That Fish Place, Lancaster, PA) and cereal leaves (Sigma Chemical Company, St. Louis, MO) once daily. The feeding schedules were suspended temporarily and the test vessels cleaned if excess food was observed on the surface of the sediment. After cleaning the test chambers of excess food and assessing water quality, feedings were resumed.

The tests were conducted in a waterbath adjusted to maintain a temperature of 23 ± 1 °C under fluorescent lighting with a daily photoperiod of 16 hours of light under ambient laboratory illumination (790 Lux) and 8 hours of darkness. After 24 hours of exposure, all of the test

[redacted]

chambers were aerated at a rate of approximately 60-80 bubbles per minute throughout the duration of the test to maintain dissolved oxygen (DO) levels above 4 mg/L. Temperature, pH and DO were measured daily, and alkalinity, ammonia and conductivity were measured at the beginning and end of the test. Water quality measurements were taken with the following instruments: temperature–Fisher Scientific digital thermocouple; pH–SA 290A Orion pH meter with an Orion 91-57 triode; dissolved oxygen–YSI, Model 57 DO meter; conductivity–YSI, Model 33 SCT conductivity meter; ammonia-- Orion Model 290A ammonia meter equipped with a Model 95-12 ammonia electrode; alkalinity and hardness--EDTA titration method. All instruments used to perform the water quality measurements were calibrated prior to use.

The test chambers were observed daily for organism entrapment at the surface of the overlying water, and sediment avoidance. At test termination, the overlying water was swirled to resuspend the top few centimeters of sediment, and then poured onto a 0.5 mm Nytex screen to collect and enumerate the surviving test organisms. The remaining sediment was poured onto a 0.50 mm Nytex screen sieve and observed in a glass tray over fluorescent lighting to collect any organisms not previously detected.

At the termination of the tests, surviving *H. azteca* were preserved in a formalin solution for growth determinations. Growth of individual surviving *H. azteca* was measured as length in millimeters with the aid of a dissecting microscope equipped with a micrometer. Growth (as group dry weight in milligrams) of the surviving *H. azteca* and *C. tentans* was measured for each replicate by placing the organisms in pre-weighed, dried aluminum pans and drying in a Blue M oven (Blue Island, Illinois) at 60 °C for 24 hours. After drying, the organisms were allowed to cool in a desiccator and the group weights of each replicate were measured on a Scientific Products S/P 180 analytical balance. The group dry weights of the replicates of each site, field reference. and laboratory control sample were used to obtain mean weights per surviving organism.

[redacted]

2.5 REFERENCE TOXICANT TEST

Ninety-six-hour reference toxicant tests, using cadmium chloride ($CdCl_2$) as the reference toxicant, were performed concurrently with the sub-chronic toxicity tests to determine the sensitivity of the test organisms. Concentrations of $CdCl_2$ selected for the reference toxicant tests were 0 (control), 8, 16, 32, 64 and 128 μg/L for *H. azteca*, and 0 (control), 125, 250, 500, 1,000, and 2,000 μg/L for *C. tentans*. Ten organisms were used per concentration with no replication and the reference toxicant tests were performed under similar conditions as the sub-chronic toxicity tests.

2.6 DETERMINATION OF ORGANIC CONTENT

The percent organic matter contents of the reference, laboratory control, and test sediments were determined using the guidelines in *Standard Method of Test for Determination of Organic Content in Soils by Loss on Ignition*, (AASHTO DESIGNATION: T 267-86). Samples were oven dried at 110 °C to constant weight and then allowed to cool at room temperature. Aliquots of the dried samples were heated in a crucible for 6 hours at 445 $\pm$ 10 °C, cooled, and the percent organic matter determined by difference.

3.0 STATISTICAL ANALYSIS

Mean survival and growth data were evaluated by a statistical comparison of the site samples with the laboratory control and the field reference sediments using appropriate statistical procedures. Analysis of variance followed by Dunnett's t-test (Snedecor and Cochran, 1980) were used to determine statistical significance. The median lethal concentration (LC_{50}), the concentration of reference toxicant lethal to 50 percent of the test population under the specified conditions of exposure, was calculated using the Trimmed Spearman-Karber Statistical Computer Program (Hamilton et. al., 1977).

[redacted]

4.0 RESULTS AND DISCUSSION

4.1 WHOLE SEDIMENT TOXICITY TEST

A summary report of the whole sediment toxicity tests is provided in Table 1. The test sediments exhibited a strong to moderate odor. Debris, including stones, decaying plant material, and indigenous organisms were removed from the site and field reference sediments prior to use in testing. Indigenous organisms removed from the site sediments included clams (11-215-00403 and 11-215-00407), insect larvae (11-215-00608), crickets (11-215-00403), and chironomids (11-215-00402, 11-215-00404, 11-215-00407, 11-215-00410, 11-215-00605, and 11-215-00606). Samples 11-215-605 and 11-215-606 exhibited a strong petroleum odor.

Results of the exposure water quality parameter measurements are presented in Tables 2 and 3 for *H. azteca* and *C. tentans*, respectively. Test conditions, including lighting, conductivity, ammonia, alkalinity, pH, dissolved oxygen, and temperature remained at acceptable levels throughout the testing period. Test temperature ranged from 22.1 to 24.0 °C, pH ranged from 7.5 to 9.1 standard units, DO ranged from 6.0 to 8.6 mg/L and solution conductivities ranged from 265 to 880 μmhos/cm for all exposures throughout the duration of the test. Ammonia nitrogen concentrations ranged from less than the reporting limit (0.10 mg/L) to 3.0 mg/L (Tables 2 and 3). Light intensity over the test area was measured to be 790 Lux. Copies of the relevant raw data pertaining to the toxicity tests are provided in Appendices B and C for *H. azteca* and *C. tentans*, respectively.

Survival and growth data for *H. azteca* after the 10-day exposure period are presented in Table 4. After 10 days of exposure, survival of *H. azteca* in the site samples ranged from 0 percent (sample 11-215-00044) to 100 percent (sample 11-215-00404). Laboratory control and reference No. 2 sediment survivorship was 93 and 100 percent, respectively. Survival of *H. azteca* in the laboratory control sediment was not significantly different (P=0.05) from survival in the reference No. 2 sediment. Survival of *Hyalella azteca* in the laboratory control and Reference No. 2 sediments was significantly different (P=0.05) from survival in sediments from sample stations 11-215-00044, 11-215-00606 and 11-215-00608. Growth of *Hyalella azteca* was measured as length, in millimeters, and weight, in milligrams. There were no significant differences (P=0.05) in growth, measured as

[redacted]

length and dry weight of *H. azteca* between the laboratory control sediment and the reference No. 2 sediment. Growth, measured as length of *Hyalella azteca* in the laboratory control and Reference No. 2 sediments was significantly different (P=0.05) from growth in sediment from sample station 11-215-00606. Growth of *Hyalella azteca* in sample 11-215-00044 could not be determined due to 100 percent mortality.

Survival and growth data for *C. tentans* after the 10-day exposure period are presented in Table 5. After 10 days of exposure, survival of *C. tentans* in the site samples ranged from 10 percent (sample 11-215-00606) to 86 percent (sample 11-215-00404). Laboratory control and reference No. 2 sediment survivorship were 83 and 71 percent, respectively. There were no significant differences (P=0.05) in the survival of *C. tentans* between the laboratory control sediment and the reference No. 2 sediment. Survival of *C. tentans* in the laboratory control sediment was significantly different (P=0.05) from survival in sediments from sample stations 11-215-00044, 11-215-00045, 11-215-00405, 11-215-00606 and 11-215-00607. However, survival of *C. tentans* in the reference No. 2 sediment was significantly different (P=0.05) from survival in sediments from only 2 sample stations, 11-21-00044 and 11-215-00606 (Table 5).

Growth, measured as dry weight of *C. tentans*, ranged from 0.223 mg/organism (sample 11-215-00044) to 1.729 mg/organism (sample 11-215-00404). Laboratory control and reference No. 2 sediment dry was 0.62 and 1.119 mg/organism, respectively. Laboratory control and Reference No. 2 sediment mean growth were within the acceptance limits (0.60 mg/organism) for this test (EPA, 1994). Growth of *Chironomus tentans* in the Reference No. 2 sediment was significantly different (P=0.05) from growth in the laboratory control sediment, and sediments from sample station 11-215-00044, 11-215-00045, and 11-215-00606 (Table 5).

Behavioral observations recorded during the test included sediment avoidance, organism emergence from the sediment, organisms at the surface of the overlying water, lethargy, and amplexus (reproductive behavior of *H. azteca* noted at test termination).

[redacted]

4.2 REFERENCE TOXICANT TEST

The 96-hour LC_{50} for the *H. azteca* reference toxicant test was calculated to be 17.15 μg $CdCl_2$/L with 95 percent confidence limits of 13.83 to 21.26 μg/L and that for *C. tentans* was calculated to be 512.53 μg $CdCl_2$/L with 95 percent confidence limits of 396.84 to 661.95 μg/L. The LC_{50} values fall within the normal sensitivity ranges of the test organisms used at QST. Copies of the reference toxicant test raw data and statistical reports are provided in Appendix D.

4.3 DETERMINATION OF ORGANIC CONTENT

The results of organic matter analysis and moisture content determination of the test, reference and laboratory control sediments are presented in Table 6. Percent organic matter of the sediment samples used in the toxicity tests ranged from 1.0 percent (11-21-00403) to 32.6 percent (11-215-00044). Laboratory control and Reference No. 2 sediments percent organic matter were <0.5 percent and 4.0 percent, respectively. Copies of the raw data for the organic content determinations are provided in Appendix E

5.0 <u>CONCLUSION</u>

Under the conditions of the 10-day study, survival of *H. azteca* in the laboratory control and Reference No. 2 sediments was significantly different (P=0.05) from survival in sediments from sample stations 11-215-00044, 11-215-00606 and 11-215-00608. Growth of *Hyalella azteca* in the Reference No. 2 sediment was significantly different (P=0.05) from growth in sediments from sample stations, 11-21-00044 and 11-215-00606. Growth of *Hyalella azteca* in sample 11-215-00044 could not be determined due to 100 percent mortality. Survival of *C. tentans* in the laboratory control sediment was significantly different (P=0.05) from survival in sediments from sample stations 11-215-00044, 11-215-00045, 11-215-00405, 11-215-00606 and 11-215-00607. However, survival of *Chironomus tentans* in the Reference No. 2 sediment was significantly different (P=0.05) from survival in sediments from only two sample stations, 11-215-00606 and 11-215-00044. Growth of *Chironomus tentans* in the Reference No. 2 sediment was significantly different (P=0.05) from growth in laboratory control sediment, and sediments from sample station 11-215-00044, 11-215-00045, and 11-215-00606. Percent organic matter of the sediment samples

[redacted]

used in the toxicity tests ranged from 1.0 percent (11-21-00403) to 32.6 percent (11-215-00044). Laboratory control and Reference No. 2 sediments percent organic matter were <0.5 percent and 4.0 percent, respectively.

6.0 REFERENCES

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Table 1. Summary Report for the Avtex Fibers Superfund Site Whole Sediment Toxicity Tests With *Hyalella azteca* and *Chironomus tentans*

Sample ID	Location	Percent Survival	
		Hyalella azteca	*Chironomus tentans*
Lab control	Control	93	83
11-215-00044	Sulfate Basin No. 5	0*	19*
11-215-00045	Fly Ash Basin No. 4	88	47[a]
11-215-00402	BMI-2	99	81
11-215-00403	BMI-3	98	78
11-215-00404	BMI-4	100	86
11-215-00405	BMI-5	91	59[a]
11-215-00407	BMI-1	99	83
11-215-00410	Reference No. 2	100	71
11-215-00605	Sulfate Basin No. 1	98	80
11-215-00606	Emergency Pond	53*	10*
11-215-00607	Polishing Pond	91	58[a]
11-215-00608	Viscose Creek	44*	85

*Significantly different ($P=0.05$) from laboratory control and reference No. 2 sediment.
[a]Significantly different ($P=0.05$) from laboratory control sediment only

[redacted]

Table 2. Water Quality Measurement Ranges[a] of Overlying Water During a 10-Day Toxicity Test Using Whole Sediment From The Avtex Fibers Superfund Site, Front Royal, VA, With *Hyalella azteca*

Sample ID	Location	DO[b] (mg/L)	Temperature (°C)	pH (s.u.)[c]	Hardness mg/L as $CaCO_3$	Alkalinity mg/L as $CaCO_3$	Conductivity (µmhos/cm)	Ammonia (ppm as N[d])
Control	Lab control	7.8-8.6	22.1-23.0	7.5-8.2	130-140	138-140	265-270	<0.10
11-215-00044	Sulfate Basin No.5	7.2-8.4	22.2-23.2	7.8-8.2	149-155	194-200	270-300	<0.10
11-215-00045	Fly Ash Basin No.4	6.9-8.3	22.2-23.1	7.5-8.0	165-170	141-150	330-365	<0.10
11-215-00402	BMI-2	6.8-8.1	22.4-23.2	7.6-8.4	147-150	196-200	370-390	0.35-0.50
11-215-00403	BMI-3	7.5-8.2	22.2-24.0	7.8-8.3	129-140	155-160	330-380	<0.10
11-215-00404	BMI-4	7.4-8.2	22.3-23.2	7.6-8.2	176-190	190-230	345-380	1.77-2.0
11-215-00405	BMI-5	6.2-8.3	22.2-23.0	7.7-8.1	162-170	165-180	330-355	0.39-0.50
11-215-00407	BMI-1	6.8-8.2	22.4-23.3	7.5-8.3	154-160	171-190	320-335	1.85-2.0
11-215-00410	Reference No. 2	7.2-8.4	22.3-23.2	7.6-8.0	160-162	151-160	295-310	<0.10
11-215-00605	Sulfate Basin No.1	6.8-8.3	22.2-23.7	7.5-8.4	143-150	188-195	355-380	2.67-3.0
11-215-00606	Emergency Pond	7.2-8.3	22.2-23.4	7.8-8.3	143-151	190-205	350-375	1.0-1.65
11-215-00607	Polishing Pond	7.0-8.2	22.4-23.4	7.6-8.4	160-166	184-200	340-380	2.53-3.0
11-215-00608	Viscose Creek	6.3-8.3	22.3-24.0	8.6-9.1	119-125	290-305	800-880	<0.10

[a]Range of 11 measurements for DO, pH, and temperature. Hardness, alkalinity, conductivity and ammonia measured at beginning and end of test.
[b]DO = dissolved oxygen;
[c]s.u. = standard units;
[d]N = nitrogen.

Table 3. Water Quality Measurement Ranges[a] of Overlying Water During a 10-Day Toxicity Test Using Whole Sediment From The Avtex Fibers Superfund Site, Front Royal, VA, With *Chironomus tentans*

Sample ID	Location	DO[b] (mg/L)	Temperature (°C)	pH (s.u.)[c]	Hardness mg/L as $CaCO_3$	Alkalinity mg/L as $CaCO_3$	Conductivity (μmhos/cm)	Ammonia (ppm as N[d])
Control	Lab control	7.8-8.4	22.3-23.3	7.6-8.2	79-84	63-74	340-355	<0.10
11-215-00044	Sulfate Basin No.5	6.0-8.2	22.3-23.2	8.0-8.3	140-155	150-160	260-285	<0.10
11-215-00045	Fly Ash Basin No.4	7.3-8.4	22.3-23.2	7.8-8.1	150-155	165-185	330-335	0.10-0.50
11-215-00402	BMI-2	6.8-8.4	22.2-23.2	7.8-8.2	127-155	160-200	340-390	<0.10
11-215-00403	BMI-3	6.9-8.5	22.2-23.2	7.8-8.2	120-140	135-140	330-380	<0.10
11-215-00404	BMI-4	6.7-8.2	22.3-23.2	7.7-8.0	150-180	155-190	340-385	1.70-2.0
11-215-00405	BMI-5	7.0-8.2	22.3-23.3	7.9-8.2	135-160	160-185	360-365	<0.10
11-215-00407	BMI-1	6.0-8.3	22.2-23.2	7.7-8.2	150-170	175-200	300-350	1.0-1.5
11-215-00410	Reference No. 2	6.0-8.3	22.3-23.2	7.8-8.2	160-165	150-160	260-290	<0.10
11-215-00605	Sulfate Basin No.1	7.0-8.2	22.3-23.2	8.1-8.5	120-140	140-155	300-310	<0.10
11-215-00606	Emergency Pond	7.2-8.1	22.3-23.3	8.0-8.3	120-125	160-175	300-340	2.0-2.0
11-215-00607	Polishing Pond	7.6-8.4	22.3-23.1	7.8-8.1	160-175	160-180	300-350	0.5-2.5
11-215-00608	Viscose Creek	6.0-8.2	22.2-23.2	8.7-9.1	110-125	250-285	800-850	<0.10

[a]Range of 11 measurements for DO, pH, and temperature. Hardness, alkalinity, conductivity and ammonia measured at beginning and end of test.
[b]DO = dissolved oxygen;
[c]s.u. = standard units;
[d]N = nitrogen.

Table 4. Survival and Growth of *Hyalella azteca* Exposed to Whole Sediments From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 10-Day Toxicity Test (Page 1 of 4)

Sample ID	Location	REP[a]	No. Alive (% Survival)	Average Growth	
				Length (mm)	Dry Weight (mg)
CONTROL	Lab Control	A	5	3.1	0.18
		B	10	3.0	0.18
		C	10	3.0	0.19
		D	9	3.0	0.20
		E	10	3.0	0.20
		F	10	3.0	0.19
		G	10	3.1	0.16
		H	10	2.8	0.18
			74 (93)	3.0	0.19
11-215-00044	Sulfate Basin No. 5	A	0	NM[c]	NM
		B	0	NM	NM
		C	0	NM	NM
		D	0	NM	NM
		E	0	NM	NM
		F	0	NM	NM
		G	0	NM	NM
		H	0	NM	NM
			0 (0)[b]		
11-215-00045	Fly Ash Basin No. 4	A	7	3.1	0.21
		B	10	3.0	0.15
		C	10	3.1	0.17
		D	10	3.0	0.19
		E	8	2.9	0.14
		F	10	3.0	0.18
		G	8	3.1	0.18
		H	7	3.1	0.14
			70 (88)	3.0	0.17
11-215-00402	BMI-2	A	10	3.2	0.26
		B	10	3.3	0.18
		C	10	3.4	0.26
		D	10	3.3	0.21
		E	10	3.2	0.21
		F	10	3.1	0.23
		G	9	3.4	0.28
		H	10	3.5	0.36
			79 (99)	3.3	0.25

[redacted]

Table 4. Survival and Growth of *Hyalella azteca* Exposed to Whole Sediments From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 10-Day Toxicity Test (Page 2 of 4)

Sample ID	Location	REP[a]	No. Alive (% Survival)	Average Growth	
				Length (mm)	Dry Weight (mg)
11-215-00403	BMI-3	A	9	3.0	0.14
		B	10	2.8	0.12
		C	10	3.1	0.21
		D	10	3.0	0.15
		E	10	3.1	0.23
		F	10	2.9	0.15
		G	10	3.1	0.18
		H	9	3.1	0.19
			78 (98)	3.0	0.17
11-215-00404	BMI-4	A	10	3.6	0.30
		B	10	3.4	0.29
		C	10	3.7	0.40
		D	10	3.5	0.31
		E	10	3.4	0.34
		F	10	3.2	0.35
		G	10	3.5	0.37
		H	10	3.3	0.36
			80 (100)	3.5	0.34
11-215-00405	BMI-5 4	A	8	3.0	0.19
		B	10	3.1	0.19
		C	8	3.2	0.16
		D	10	3.2	0.19
		E	10	3.1	0.20
		F	10	3.2	0.21
		G	10	3.3	0.25
		H	7	3.1	0.23
			73 (91)	3.2	0.20
11-215-00407	BMI-1	A	10	3.1	0.30
		B	10	3.3	0.31
		C	10	3.4	0.28
		D	10	3.4	0.33
		E	9	3.4	0.28
		F	10	3.2	0.31
		G	10	3.1	0.22
		H	10	3.2	0.28
			79 (99)	3.3	0.29

[redacted]

Table 4. Survival and Growth of *Hyalella azteca* Exposed to Whole Sediments From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 10-Day Toxicity Test (Page 3 of 4)

Sample ID	Location	REP[a]	No. Alive (% Survival)	Average Growth	
				Length (mm)	Dry Weight (mg)
11-215-00410	Reference No. 2	A	10	3.0	0.13
		B	10	3.0	0.19
		C	10	3.0	0.18
		D	10	2.9	0.12
		E	10	3.0	0.17
		F	10	3.0	0.17
		G	10	3.0	0.25
		H	10	3.0	0.23
			80 (100)	3.0	0.18
11-215-00605	Sulfate Basin No. 1	A	8	3.2	0.18
		B	10	3.2	0.19
		C	10	3.3	0.23
		D	10	3.1	0.22
		E	10	3.0	0.20
		F	10	3.3	0.23
		G	10	3.3	0.20
		H	10	3.4	0.29
			78 (98)	3.2	0.22
11-215-00606	Emergency Pond	A	5	2.7	0.10
		B	9	2.4	0.11
		C	2	2.7	0.10
		D	6	2.6	0.17
		E	5	2.9	0.12
		F	10	2.7	0.15
		G	1	2.4	0.20
		H	4	2.6	0.15
			42 (53)[b]	2.6	0.14
11-215-00607	Polishing Pond	A	10	3.1	0.23
		B	10	3.0	0.19
		C	10	2.9	0.12
		D	9	3.0	0.13
		E	10	3.0	0.19
		F	9	3.0	0.19
		G	8	3.1	0.21
		H	7	3.0	0.19
			73 (91)	3.0	0.18

[redacted]

Table 4. Survival and Growth of *Hyalella azteca* Exposed to Whole Sediments From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 10-Day Toxicity Test (Page 4 of 4)

Sample ID	Location	REP[a]	No. Alive (% Survival)	Average Growth	
				Length (mm)	Dry Weight (mg)
11-215-00608	Viscose Creek	A	4	2.8	0.10
		B	4	3.2	0.20
		C	7	3.1	0.14
		D	5	2.6	0.12
		E	6	3.0	0.18
		F	5	2.7	0.14
		G	1	2.5	0.10
		H	3	3.1	0.20
			35 (44)[b]	2.9	0.15

[a] Ten organisms exposed per replicate (REP).
[b] Significantly different ($P \leq 0.05$) from laboratory control sediment.
[c]NM=not measured due to 100 percent mortality.

[redacted]

Table 5. Survival and Growth of *Chironomus tentans* Exposed to Whole Sediments From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 10-Day Toxicity Test (Page 1 of 4)

Sample ID	Location	REP[a]	No. Alive (% Survival)	Mean Dry Weight (mg)
CONTROL	Lab Control	A	9	0.83
		B	9	0.62
		C	7	0.54
		D	7	0.59
		E	8	0.76
		F	8	0.55
		G	8	0.56
		H	10	0.51
			66 (83)	0.62
11-215-00044	Sulfate Basin No. 5	A	0	NM[c]
		B	2	0.30
		C	1	0.20
		D	3	0.20
		E	5	0.16
		F	2	0.25
		G	1	0.20
		H	1	0.30
			15 (19)[b]	0.22
11-215-00045	Fly Ash Basin No. 4	A	4	0.18
		B	6	0.30
		C	6	0.15
		D	7	0.30
		E	4	0.33
		F	6	0.28
		G	8	0.35
		H	6	0.32
			47 (59)[b]	0.28
11-215-00402	BMI-2	A	7	1.80
		B	8	1.45
		C	10	1.32
		D	8	1.53
		E	9	1.34
		F	7	1.73
		G	8	1.20
		H	8	1.84
			65 (81)	1.53

[redacted]

Table 5. Survival and Growth of *Chironomus tentans* Exposed to Whole Sediments From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 10-Day Toxicity Test (Page 2 of 4)

Sample ID	Location	REP[a]	No. Alive (% Survival)	Mean Dry Weight (mg)
11-215-00403	BMI-3	A	6	1.00
		B	10	1.02
		C	8	1.18
		D	8	1.05
		E	9	1.08
		F	8	0.80
		G	8	0.84
		H	5	0.86
			62 (78)	0.98
11-215-00404	BMI-4	A	7	1.86
		B	9	1.47
		C	10	1.41
		D	8	2.00
		E	9	1.90
		F	8	2.11
		G	10	1.30
		H	8	1.78
			69 (86)	1.73
11-215-00405	BMI-5	A	8	0.69
		B	4	0.90
		C	5	1.04
		D	4	0.75
		E	6	1.18
		F	8	0.68
		G	7	0.99
		H	5	0.84
			47 (59)[b]	0.88
11-215-00407	BMI-1	A	7	2.46
		B	7	1.94
		C	9	1.76
		D	6	1.57
		E	10	1.75
		F	7	1.73
		G	10	1.43
		H	10	1.78
			66 (83)	1.80

[redacted]

Table 4. Survival and Growth of *Chironomus tentans* Exposed to Whole Sediments From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 10-Day Toxicity Test (Page 3 of 4)

Sample ID	Location	REP[a]	No. Alive (% Survival)	Mean Dry Weight (mg)
11-215-00410	Reference No. 2	A	6	1.67
		B	8	0.99
		C	8	0.96
		D	4	1.25
		E	8	0.86
		F	8	0.85
		G	7	1.41
		H	8	0.96
			57 (71)	1.12
11-215-00605	Sulfate Basin No. 1	A	9	0.84
		B	7	1.30
		C	10	0.89
		D	6	0.98
		E	9	1.24
		F	8	1.06
		G	10	0.93
		H	5	1.28
			64 (80)	1.07
11-215-00606	Emergency Pond	A	1	0.50
		B	1	0.30
		C	0	NM
		D	2	0.25
		E	0	NM
		F	4	0.33
		G	0	NM
		H	0	NM
			8 (10)[b]	0.35
11-215-00607	Polishing Pond	A	5	1.62
		B	8	1.06
		C	6	1.40
		D	5	1.54
		E	6	1.10
		F	5	1.32
		G	5	1.50
		H	6	1.35
			46(58)[b]	1.36

[redacted]

Table 4. Survival and Growth of *Chironomus tentans* Exposed to Whole Sediments From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 10-Day Toxicity Test (Page 4 of 4)

Sample ID	Location	REP[a]	No. Alive (% Survival)	Mean Dry Weight (mg)
11-215-00608	Viscose Creek	A	7	1.14
		B	9	1.26
		C	9	1.09
		D	9	0.83
		E	8	1.19
		F	9	1.37
		G	7	1.04
		H	10	1.29
			68 (88)	1.15

[a] Ten organisms exposed per replicate (REP).
[b] Significantly different ($P \leq 0.05$) from laboratory control sediment.
[c] NM=not measured due to 100 percent mortality.

[redacted]

Table 6. Results of Organic Content and Moisture Analysis for the Sediments From the Avtex Fibers Superfund Site, Front Royal, Virginia, Used in the Toxicity Tests

Sample ID	Location	Percent Moisture	Percent Organic Matter
Lab control	Control	20	<0.50
11-215-00044	Sulfate Basin No. 5	84.3	32.6
11-215-00045	Fly Ash Basin No. 4	54.6	13.8
11-215-00401*	Reference*	71.5	12.2
11-215-00402	BMI-2	37.4	4.5
11-215-00403	BMI-3	21.4	1.0
11-215-00404	BMI-4	27.8	2.0
11-215-00405	BMI-5	28.7	2.2
11-215-00406*	BMI-6*	22.1	1.0
11-215-00407	BMI-1	43.9	4.8
11-215-00410	Reference No. 2	34.6	4.0
11-215-00605	Sulfate Basin No. 1	67.5	10.2
11-215-00606	Emergency Pond	25.1	1.9
11-215-00607	Polishing Pond	69.6	9.8
11-215-00608	Viscose Creek	38.4	5.7

*Not used for toxicity testing.

Appendix A: Chain-of-Custody and Traffic Information

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-021

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 2
Cooler #:008172
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352)332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	D	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	8 oz glass/wet ice, 4C	TOC		
	D	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00401	Reference	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00402	BMI-2	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00403	BMI-3	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00404	BMI-4	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00405	BMI-5	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00406	BMI-6	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00407	BMI-1	Sediment	5/13/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00410	Reference No. 2	Sediment	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00501	Reference	Soil	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00502	Wetland Area	Soil	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00503	Emergency Pond	Soil	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00504	PCB Area	Soil	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00505	Treatment Plant	Soil	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00506	Fly Ash Pile	Soil	5/15/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00605	Sulfate Basin No. 1	Sediment	5/14/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00606	Emergency Pond	Sediment	5/14/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00607	Polishing Pond	Sediment	5/14/97	8 oz glass/wet ice, 4C	TOC		
	C	11-215-00608	Viscose Creek	Sediment	5/14/97	8 oz glass/wet ice, 4C	TOC		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all/analyses	Mark Huston	5/14/97	J. Owusu-Yaw	5/17/97	1305						

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-022

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-O41-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 2 of 2
Cooler #:006172
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352) 332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	E	11-215-00410	Reference No. 2	Sediment	5/15/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	F	11-215-00410	Reference No. 2	Sediment	5/15/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	G	11-215-00410	Reference No. 2	Sediment	5/15/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00410	Reference No. 2	Sediment	5/15/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/16/97	J. Owusu-Yaw	5/17/97	1305						

AR300951

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-009

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:002383
Lab: ESE, Inc
Contact: Joe Owusu Yaw
(352)-332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	~~G~~	~~11-215-00401~~	~~Reference~~	~~Sediment~~	~~5/13/97~~	~~32 oz glass/wet ice, 4C~~	~~C.tentans Toxicity Test~~		DO NOT USE JM/97
	~~H~~	~~11-215-00401~~	~~Reference~~	~~Sediment~~	~~5/13/97~~	~~32 oz glass/wet ice, 4C~~	~~C.tentans Toxicity Test~~		
	G	11-215-00402	BMI-2	Sediment	5/13/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00402	BMI-2	Sediment	5/13/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	G	11-215-00403	BMI-3	Sediment	5/13/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00403	BMI-3	Sediment	5/13/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	G	11-215-00404	BMI-4	Sediment	5/13/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00404	BMI-4	Sediment	5/13/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		

Special Instructions: Peer review

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
1-4/Analysis	Mark Huston	5/14/97	J. Owusu-Yaw	5/15/97	1130						

AR300952

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-011

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:004602
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352)332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	~~E~~	~~11-215-00401~~	~~Reference~~	~~Sediment~~	~~5/13/97~~	~~32 oz glass/wet Ice, 4C~~	~~H.azteca Toxicity Test~~		
	~~F~~	~~11-215-00401~~	~~Reference~~	~~Sediment~~	~~5/13/97~~	~~32 oz glass/wet Ice, 4C~~	~~H.azteca Toxicity Test~~ Do	not	Use
	E	11-215-00402	BMI-2	Sediment	5/13/97	32 oz glass/wet Ice, 4C	H.azteca Toxicity Test		
	F	11-215-00402	BMI-2	Sediment	5/13/97	32 oz glass/wet Ice, 4C	H.azteca Toxicity Test		
	E	11-215-00403	BMI-3	Sediment	5/13/97	32 oz glass/wet Ice, 4C	H.azteca Toxicity Test		
	F	11-215-00403	BMI-3	Sediment	5/13/97	32 oz glass/wet Ice, 4C	H.azteca Toxicity Test		
	E	11-215-00404	BMI-4	Sediment	5/13/97	32 oz glass/wet Ice, 4C	H.azteca Toxicity Test		
	F	11-215-00404	BMI-4	Sediment	5/13/97	32 oz glass/wet Ice, 4C	H.azteca Toxicity Test		

Special Instructions:

Peer review

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/14/97	J. Owusu-Yaw	5/15/97	1130						

AR300953

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-010

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:006359
Lab: ESE Inc
Contact: Joe Owusu Yaw
(352)332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	H	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	I	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	I	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	G	11-215-00405	BMI-5	Sediment	5/13/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00405	BMI-5	Sediment	5/13/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	G	11-215-00407	BMI-1	Sediment	5/13/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00407	BMI-1	Sediment	5/13/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		

Special Instructions: Rerreview

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all/analyses	M. Huston	5/14/97	J. Owusu Yaw	5/15/97	1130						

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-012

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Aviex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
7772 Cooler #:
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352)-332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	F	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	G	11-215-00044	Sulfate Basin No. 5	Sediment	5/12/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	F	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	G	11-215-00045	Fly Ash Basin No.4	Sediment	5/12/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	E	11-215-00405	BMI-5	Sediment	5/13/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	F	11-215-00405	BMI-5	Sediment	5/13/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	E	11-215-00407	BMI-1	Sediment	5/13/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	F	11-215-00407	BMI-1	Sediment	5/13/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/14/97	J. Owusu-Yaw	5/15/97	1200						

AR300955

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-016

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4265
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:007174
Lab: ESE, Inc.
Contact: Joe Osusu Yaw
(352)332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	E	11-215-00605	Sulfate Basin No. 1	Sediment	5/14/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	F	11-215-00605	Sulfate Basin No. 1	Sediment	5/14/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	G	11-215-00605	Sulfate Basin No. 1	Sediment	5/14/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00605	Sulfate Basin No. 1	Sediment	5/14/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	E	11-215-00606	Emergency Pond	Sediment	5/14/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	F	11-215-00606	Emergency Pond	Sediment	5/14/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	G	11-215-00606	Emergency Pond	Sediment	5/14/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00606	Emergency Pond	Sediment	5/14/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		

[redacted]

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/15/97	J.O. Yaw	5/14/97	12:05						

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-015

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4265
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:002364
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352)-332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	E	11-215-00607	Polishing Pond	Sediment	5/14/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	F	11-215-00607	Polishing Pond	Sediment	5/14/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	G	11-215-00607	Polishing Pond	Sediment	5/14/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00607	Polishing Pond	Sediment	5/14/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	E	11-215-00608	Viscose Creek	Sediment	5/14/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	F	11-215-00608	Viscose Creek	Sediment	5/14/97	32 oz glass/wet ice, 4C	H.azteca Toxicity Test		
	G	11-215-00608	Viscose Creek	Sediment	5/14/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		
	H	11-215-00608	Viscose Creek	Sediment	5/14/97	32 oz glass/wet ice, 4C	C.tentans Toxicity Test		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/15/97	J.O.Yaw	5/16/97	1205						

Appendix B: *Hyalella azteca* Sediment Toxicity Test Raw Data

Project: 3197225-0100 Sedimen

DAILY LOG

5-18-97 Sediment samples received on 5-16-97 and 5-17-97. On 5-17-97 sediment samples were removed from storage ($4 \pm 2°C$) + warmed to room temperature. All sediments were processed (hand-sorted and/or sifted) to remove indigenous organisms and debris. 100g of each sample placed in each of 8 replicate chambers (pint jars). 175 mL of overlying water added to each replicate chamber. Chambers will settle overnight unaerated. CTM-8 placed in waterbath to monitor temperature of bath. LIGHT INTENSITY → 790 LUX. Observations during processing below:

#44 SURFACE BASIN 5: no organisms found; clay soft, harsh smell

#405 BMG-5: Sandy, no organisms, strong smell

#407 BMI-1: Dark mix of clay/sand; clams + Chironomids present (alive); sifted

#404 BMI-2: Dark mix of clay/sand; Chironomids present (alive)

#45 FLY ASH 4: no organisms found, dark mix of clay/sand; strong smell

MBI-3: clams, cricket found, sandy, strong smell, stones + debris removed.

#402 BMI-4: sandy, Chironomids present, removed debris

[redacted]

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
ESE QA Form Number: 018
Effective: APR 1993

Project: 3197225-0100

DAILY LOG

5-18-97 (cont) CR
#608 VISCOSE CREEK: dark clay; strong odor
6 insect larva removed
#605 SULFATE #1: dark/loose; strong odor (gasoline)
Chironomids present
#606 EMERGENCY POND: strong gasoline smell (raw)
chironomids present (alive + dead); dark
loose sediment
#607 POLISHING BASIN: dark; strong odor
no organisms found
#410 REFERENCE 2: Chironomids present;
brown clay; sieved

note: on 5-17-97 H. azteca received +
acclimated to test conditions appeared
to be in normal condition
5-19-97 CR Gmm-8 reads 76°F (24 °C). Airlines
placed in test chambers and aeration set
at ≈ 60 bpm. for 1 hour prior to loading
H. azteca 10 per rep (8 reps)
5-20-97 CR Gmm-8 reads 76°F (24 °C). Airlines
placed in C. tentans test chambers + aeration
set ≈ 65 bpm for 1 hour prior to loading.
BOTH Tests monitored. H. azteca test ob-
served. H. azteca fed after renewal. note
Sample #44 AVOIDANCE OF SEDIMENT; Return
to surface of water after minutes of being

AR300960

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ___
ESE QA Form Number: 018
Effective: APR 1993

Project: 3197775-0100

DAILY LOG

5-20-97 (cont) CR pipetted under water surface.

5-21-97 MO - The C. tentans was not initiated on 5-20-97 due to the poor conditions of the organisms received on 5-20-97. C. tentans received on 5-21-97 were in normal condition and were used to initiate the C. tentans test. The H. azteca test was monitored + overlying water renewed. Aeration of both tests were checked + is at ~ 60 bpm. com-8 reads 78°F

5-22-97 CR C. tentan + H. azteca tests renewed, observed and monitered. Airlines checked. com-8 reads 79°F

5-23-97 CR. C. tentan + H. azteca tests renewed, observed + monitered. Airlines checked. com-8 reads 78°F

5-24-97 MO - C. tentans + H. azteca tests renewed, observed + monitored. Airlines checked (aeration at ~80 bpm). com-8 reads 79°F.

5-25-97 MO - C. tentans + H. azteca tests renewed, observed + monitored. Aeration checked. com-8 reads 79°F.

5-26-97 MO - C. tentans + H. azteca tests renewed, observed + monitored. Airlines checked. com-8 reads 78°F.

5-27-97 MO - C. tentans + H. azteca tests renewed, observed + monitored. Airlines checked. com-8 reads 78°F.

5-28-97 MO - C. tentans + H. azteca tests renewed, observed + monitored. Airlines checked. com-8 reads 78°F.

[redacted]

AR300961

Project: 3197225-0100-3100

DAILY LOG

5-29-97 MO – C. tentans test monitored + renewed; COM-8 reads 78°F. The H. azteca test was concluded – test organisms from each replicate were recovered from the sediment, enumerated + observed, then placed in vials containing formaldehyde for preservation.

5-30-97 MO – C. tentans test monitored + renewed; COM-8 reads 78°F. Airlines checked.

5-31-97 MO – C. tentans test concluded – test organisms recovered from sediment, rinsed with deionized water + placed in pre-weighed aluminum pans. Pans placed in oven (60°C) to dry.

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ______
ESE QA Form: 097A
Effective: August 1994

SUBJECT: TOXICITY TEST DATA SHEET

Client: ROY F. WESTON

Project Number: 3197225-0100

Test Material

See Page ______ of Sample Receipt Log
Test Material Information

Test Conditions

[ ] Preliminary
[X] Definitive
[ ] Screening

[X] Static [ ] Flow-through

Duration : 10 days

Test Animal History

Species : H. azteca
Batch Number : 97-35
Age / Life Stage : 2-4mm (Juvenile)
Date Acclimation / Maintenance Began : 5/17/97
See Page 178 of Invertebrate Holding Log for raw data.
Mortality (%) 48 Hrs prior to testing: 0 %

Dilution Water: Hard water (WELL/DI)

Lighting : [X] Fluorescent [ ] Incandescent
Photoperiod : 16 hr Light : 8 hr Dark

Test Container Dimensions (cm): 7 L x – W x 13 H
Test Solution Height : 6.5 cm
Test Containers : [ ] Open [X] Covered
Test Container Volume : 0.47 Liters
Diluent Volume : 0.175 Liters

Test Area Used	Temperature (C)	Salinity (ppt)
waterbath 8	23 +/- 1	NA +/-

Reps / Concentration : 8
Animals / Replicate : 5

Protocol Followed: EPA600/R-94/024

Concentrations Based on: [ ] A.I. [X] W.M.

Container Composition: [X] Glass [ ] Plastic

Test Concentrations: (Units = %):	Control												
Amount ~~Reference Soil~~ overlying water Added (g/mL):	175	175	175	175	175	175	175	175	175	175	175	175	175
Amount Test Soil Added (g/mL):	100 N/A	100	100	100	100	100	100	100	100	100	100	100	100

Additional Observations: ______

Data By: ______ Date: ______

FORM: Soil94

MIcR

AR300963

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F. WESTON
SAMPLE ID: CONTROL
PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. azteca

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	23.0	138.0	<0.01	7.5	7.9	270.0	—	CR 1100
5-20-97 1	B	22.2	—	—	8.2	7.9	—	ALG/YTC	JDY 1030
5-21-97 2	C	22.5	—	—	8.1	7.8	—	YTC	MO 1630
5-22-97 3	D	22.4	—	—	8.1	8.6	—	YTC	CR 1000
5-23-97 4	E	22.2	—	—	8.0	8.4	—	YTC	MO 1130
5-24-97 5	F	22.3	—	—	8.1	8.4	—	YTC	MO 1330
5-25-97 6	G	22.8	—	—	8.0	8.4	—	YTC	JDY 1315
5-26-97 7	H	22.9	—	—	8.0	8.2	—	YTC	MO 1300
5-27-97 8	A	23.0	—	—	8.0	8.0	—	YTC	MO 1115
5-28-97 9	B	22.3	—	—	8.0	8.1	—	YTC	MO 1030
5-29-97 10	C	22.1	140.0	<0.01	8.0	7.9	265.0	—	MO 0845

OBSERV DATE-DAY	REPLICATE A	B	C	D	E	F	G	H	Initial
5-19-97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1430
5-20-97 1	6 EMR	2 EMR	7 EMR	5 EMR	6 EMR	5 EMR	5 EMR	7 EMR	CR 1035
5-21-97 2	2 EMR	N	2 EMR	2 EMR	3 EMR	4 EMR	3 EMR	4 EMR	MO 1630
5-22-97 3	N	1 EMR	2 EMR	4 EMR	5 EMR	4 EMR	3 EMR	3 EMR	CR 1030
5-23-97 4	N	2 EMR	4 EMR	8 EMR	3 EMR	5 EMR	4 EMR	4 EMR	CR 1200
5-24-97 5	1 EMR	3 EMR	3 EMR	6 EMR	4 EMR	2 EMR	1 AS 2 EMR	3 EMR	MO 1345
5-25-97 6	2 EMR	4 EMR	1 EMR	6 EMR	6 EMR	5 EMR	6 EMR	4 EMR	JDY 1205
5-26-97 7	3 EMR	3 EMR	2 EMR	5 EMR	7 EMR	6 EMR	3 EMR	2 EMR	MO 1300
5-27-97 8	2 EMR	1 EMR	3 EMR	3 EMR	3 EMR	4 EMR	1 EMR	3 EMR	MO 1130
5-28-97 9	2 EMR	2 EMR	1 EMR	4 EMR	3 EMR	3 EMR	5 EMR	2 EMR	MO 1100
5-29-97 10	5A 5NF	10A	10A	9A 1NF	10A 1AMP	10A	10A	10A	MO 0930

Comments:

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL
L=LOADED

[redacted]

AR300964

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F. WESTON
SAMPLE ID: 404
PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. azteca

DATE-DAY		REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (μmhos/cm)	FEEDING	INITIAL/TIME
5-19-97	0	A	23.0	~~345~~* 176/190	1.77	7.5	7.4	345	—	CR 1100
5-20-97	1	B	22.7		—	8.1	7.5	—	ALG/YTC	CR 1030
5-21-97	2	C	22.7	—	—	7.6	7.8	—	YTC	MO 1630
5-22-97	3	D	22.8	—	—	7.9	8.0	—	YTC	CR 1000
5-23-97	4	E	23.0	—	—	8.0	8.1	—	YTC	MO 1130
5-24-97	5	F	22.4	—	—	7.8	8.2	—	YTC	MO 1330
5-25-97	6	G	22.4	—	—	7.9	8.1	—	YTC	JN 1315
5-26-97	7	H	22.5	—	—	8.0	8.1	—	YTC	MO 1300
5-27-97	8	A	23.2	—	—	8.1	7.8	—	YTC	MO 1115
5-28-97	9	B	22.3	JN 5/30/97	—	8.2	7.9	—	YTC	MO 1030
5-29-97	10	C	22.6	~~370~~ 190/230	2.0	7.8	7.8	380	—	MO 0845

OBSERV		REPLICATE								
DATE-DAY		A	B	C	D	E	F	G	H	Initial
5-19-97	0	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	CR 1430
5-20-97	1	∩	∩	∩	∩	∩	∩	∩	∩	CR 1030
5-21-97	2	N	N	N	N	N	N	N	N	MO 1630
5-22-97	3	∩	∩	∩	∩	∩	∩	∩	∩	CR 1030
5-23-97	4	∩	∩	∩	∩	∩	∩	∩	∩	CR 1200
5-24-97	5	N	N	N	N	N	N	N	N	MO 1340
5-25-97	6	N	N	N	N	N	N	N	N	JOY 1200
5-26-97	7	N	N	N	N	N	N	N	N	MO 1300
5-27-97	8	N	3 EMR	N	3 EMR	N	N	1 EMR	N	MO 1130
5-28-97	9	N	N	N	1 EMR	N	N	N	N	MO 1100
5-29-97	10	10A 1 AMP	10A 1 AMP	10A	10A 1 AMP	10A 1 AMP	10A 2 AMP	10A 1 AMP	10A	MO 0945

Comments:

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: Roy F. Weston
SAMPLE ID: 407

PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. azteca

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	22.8	154/171	1.85	7.5	6.8	320	—	CR 1100
5-20-97 1	B	22.6	—	—	8.2	7.1	—	ALG/YTC	JW 1030
5-21-97 2	C	22.7	—	—	7.7	7.4	—	YTC	MO 1630
5-22-97 3	D	22.8	—	—	8.0	7.9	—	YTC	CR 1000
5-23-97 4	E	22.9	—	—	8.1	8.1	—	YTC	MO 1130
5-24-97 5	F	22.5	—	—	8.0	8.2	—	YTC	MO 1330
5-25-97 6	G	23.0	—	—	7.9	7.2	—	YTC	MO 1315
5-26-97 7	H	22.6	—	—	8.0	7.8	—	YTC	MO 1300
5-27-97 8	A	23.3	—	—	8.3	7.9	—	YTC	MO 1115
5-28-97 9	B	22.4	—	—	8.2	7.6	—	YTC	MO 1030
5-29-97 10	C	22.6	160/190	2.0	8.2	7.5	335	—	MO 0848

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5-19-97 0	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	CR 1430
5-20-97 1	N	N	N	N	N	N	N	N	CR 1035
5-21-97 2	N	N	N	N	N	N	N	N	MO 1630
5-22-97 3	N	N	N	N	N	N	N	N	CR 1030
5-23-97 4	N	N	N	N	N	N	N	N	CR 1200
5-24-97 5	N	N	N	N	N	N	N	N	MO 845
5-25-97 6	N	N	N	N	N	N	N	N	JW 1200
5-26-97 7	N	N	N	N	N	N	N	N	MO 1300
5-27-97 8	N	N	N	N	N	N	N	N	MO 1130
5-28-97 9	N	N	N	N	N	N	N	N	MO 1100
5-29-97 10	10A 2 AMP	10A 1 AMP	10A	10A 1 AMP	9A 1NF 1AMP	10A	10A	10A 2 AMP	MO 1000

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY FUNKSTON SAMPLE ID: 407	PROJECT NUMBER: 3197225-0100 TEST SPECIES: H. azteca

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	22.7	147/196	0.35	7.6	6.8	370	—	CR 1100
5-20-97 1	B	22.5	—	—	8.1	6.8	—	ALG/YTC	JY 1030
5-21-97 2	C	22.7	—	—	7.7	7.0	—	YTC	MO 1630
5-22-97 3	D	22.8	—	—	8.1	7.8	—	YTC	CR 1000
5-23-97 4	E	22.8	—	—	8.2	7.9	—	YTC	MO 1130
5-24-97 5	F	22.5	—	—	8.1	8.1	—	YTC	MO 1330
5-25-97 6	G	23.2	—	—	7.8	7.9	—	YTC	JY 1315
5-26-97 7	H	22.7	—	—	7.9	8.0	—	YTC	MO 1300
5-27-97 8	A	23.2	—	—	8.3	7.8	—	YTC	MO 1115
5-28-97 9	B	22.4	—	—	8.4	7.7	—	YTC	MO 1030
5-29-97 10	C	22.6	150/200	0.50	8.3	7.6	390	—	MO 0845

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5-19-97 0	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	10 LOADED	CR 14
5-20-97 1	∩	∩	∩	∩	∩	∩	∩	∩	CR 1035
5-21-97 2	N	N	N	N	N	N	N	N	MO 1630
5-22-97 3	∩	∩	∩	∩	∩	∩	∩	∩	CR 1030
5-23-97 4	∩	∩	∩	∩	∩	∩	∩	∩	MO 1230
5-24-97 5	N	N	N	N	N	N	N	N	MO 1345
5-25-97 6	N	N	N	N	N	N	N	N	JY 1205
5-26-97 7	N	N	N	N	N	N	N	N	MO 1300
5-27-97 8	N	N	N	N	N	N	N	N	MO 1130
5-28-97 9	N	N	N	N	N	N	N	N	MO 1100
5-29-97 10	10A 1AMP	10A 2AMP	10A	10A 1AMP	10A 1AMP	10A 1AMP	9A 1NF	10A 1AMP	MO 101

Comments:

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F. WESTON
SAMPLE ID: 607
PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. azteca

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (μmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	22.7	166/184	2.53	7.6	7.6	340	—	CR 1100
5-20-97 1	B	22.3	—	—	8.1	7.0	—	ALG/YTC	JOY 1030
5-21-97 2	C	22.6	—	—	7.7	7.3	—	YTC	MO 1630
5-22-97 3	D	22.8	—	—	8.1	7.7	—	YTC	CR 1000
5-23-97 4	E	22.8	—	—	8.4	8.0	—	YTC	MO 1130
5-24-97 5	F	22.6	—	—	8.1	8.2	—	YTC	MO 1330
5-25-97 6	G	23.4	—	—	8.2	8.0	—	YTC	JY 1315
5-26-97 7	H	22.8	—	—	8.1	7.9	—	YTC	MO 1300
5-27-97 8	A	23.3	—	—	8.2	7.9	—	YTC	MO 1115
5-28-97 9	B	22.5	—	—	8.2	7.7	—	YTC	MO 1030
5-29-97 10	C	22.4	160/200	3.0	8.2	7.8	380	—	MO 0845

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5-19-97 0	10L	10L	10L	10L	10L	10L	10L	10L	CR 1430
5-20-97 1	3AS	2AS	3AS	2AS	8AS	5AS	5AS	6AS	CR 1035
5-21-97 2	N	N	1AS	1 DEAD 1AS	N	N	N	N	MO 1630
5-22-97 3	N	N	N	N	N	N	N	N	CR 1030
5-23-97 4	N	1AS	N	N	N	N	1AS	N	CR 1200
5-24-97 5	N	N	N	N	N	N	N	N	MO 1345
5-25-97 6	N	N	N	N	N	N	N	N	JY 1205
5-26-97 7	N	N	N	N	N	N	N	N	MO 1300
5-27-97 8	1EMR	N	N	2EMR	2EMR	N	1EMR	N	MO 1130
5-28-97 9	1EMR	1EMR	N	N	1EMR	1EMR	2EMR	N	MO 1100
5-29-97 10	10A	10A	10A	9 ~~10~~A	10A, ~~1NF~~	9A, 1NF	8A 2NF	7A 3NF	MO 1045

Comments: ⓐ MO 5/29/97 (WS) MO 5/29/97 (WP)

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL
L = LOADED

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F WESTON
SAMPLE ID: 410 -

PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. azteca

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	22.6	162/151	<0.1	7.6	7.6	295	—	CR 1100
5-20-97 1	B	22.3	—	—	8.0	7.3	—	ALG/YTC	JDY 1030
5-21-97 2	C	22.6	—	—	7.6	7.2	—	YTC	MO 1630
5-22-97 3	D	22.8	—	—	8.0	7.9	—	YTC	CR 1000
5-23-97 4	E	22.6	—	—	8.0	8.4	—	YTC	MO 1130
5-24-97 5	F	22.5	—	—	8.0	8.3	—	YTC	MO 1330
5-25-97 6	G	23.1	—	—	8.0	8.2	—	YTC	JDY 1315
5-26-97 7	H	22.7	—	—	7.9	8.3	—	YTC	MO 1300
5-27-97 8	A	23.2	—	—	8.0	8.3	—	YTC	MO 1115
5-28-97 9	B	22.8	—	—	8.0	7.9	—	YTC	MO 1030
5-29-97 10	C	22.5	160/160	<0.1	8.0	7.8	310	—	MO 0845

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	INITIAL
5-19-97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1430
5-20-97 1	⌒	⌒	⌒	⌒	⌒	⌒	⌒	⌒	CR 0830
5-21-97 2	N	N	N	N	N	N	N	N	MO 1630
5-22-97 3	⌒	⌒	⌒	⌒	⌒	⌒	⌒	⌒	CR 1030
5-23-97 4	⌒	⌒	⌒	⌒	⌒	⌒	⌒	⌒	MO 1200
5-24-97 5	N	N	N	N	N	N	N	N	MO 1345
5-25-97 6	N	N	N	N	N	N	N	N	JDY 1205
5-26-97 7	N	N	N	N	N	N	N	N	MO 1300
5-27-97 8	N	N	1 EMR	N	N	N	N	N	MO 1130
5-28-97 9	N	N	N	N	N	N	N	N	MO 1100
5-29-97 10	10A	10A	10A	10A	10A	10A	10A	10A	MO 1115

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT [illegible]D
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL
L = LOADED

[redacted]

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F WESTON
SAMPLE ID: 606
PROJECT NUMBER: 3197225-0100-3100
TEST SPECIES: H. azteca

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (μmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	22.6	143/190	1.65	7.8	7.6	350	—	CR 1100
5-20-97 1	B	22.2	—	—	8.2	7.2	—	ALG/YTC	JY 1030
5-21-97 2	C	22.6	—	—	7.9	7.2	—	YTC	MO 1630
5-22-97 3	D	22.7	—	—	8.2	8.3	—	YTC	CR 1000
5-23-97 4	E	22.6	—	—	8.2	8.1	—	YTC	MO 1130
5-24-97 5	F	22.6	—	—	8.1	8.3	—	YTC	MO 1330
5-24-97 6	G	23.4	—	—	8.2	7.9	—	YTC	JY 1315
5-26-97 7	H	22.7	—	—	8.1	8.2	—	YTC	MO 1300
5-27-97 8	A	23.2	—	—	8.2	7.9	—	YTC	MO 1110
5-28-97 9	B	22.5	—	—	8.3	7.7	—	YTC	MO 1030
5-29-97 10	C	22.4	151/205	1.00	8.2	7.5	375	—	MO 0845

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5-19-97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1430
5-20-97 1	3 AS	4 AS	8 AS	6 AS	3 AS	6 AS	8 AS	1 AS	CR 1035
5-21-97 2	3 AS	1 AS	1 DEAD 2 AS	3 AS	2 AS	4 AS	4 AS	2 AS	MO 1630
5-22-97 3	N	N	N	N	N	N	N	N	CR 1000
5-23-97 4	1 AS 1 DEAD	N	1 AS	1 AS	N	N	1 AS	N	CR 1200
5-24-97 5	N	N	N	N	N	N	1 AS	N	MO 1345
5-25-97 6	N	N	N	N	N	N	N	N	JY 1205
5-26-97 7	N	N	N	N	N	N	N	N	MO 1300
5-27-97 8	N	N	N	N	N	N	N	N	MO 1130
5-28-97 9	1 EMR	N	N	1 EMR	1 EMR	1 EMR	N	1 DEAD	MO 1100
5-29-97 10	~~4A~~, 2D ® 2NF, 5A	9A, 1D	2A 2D 5NF	6A, 4NF	5A 1D 4NF	10A Barely	1A, 3D 6NF	4A, 5NF	MO 1145

Comments: petroleum odor noted 5-20-97
5/29/97 MO - Petroleum odor ; test organisms are lethargic
® MO 5/29/97 (EO)

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

L = LOADED

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F. WESTON
SAMPLE ID: 605

PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. AZTECA

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	22.7	142/188	2.67	7.5	6.8	355	—	CR 1100
5-20-97 1	B	22.2	—	—	8.2	7.2	—	ALG/YTC	JDY 1030
5-21-97 2	C	22.7	—	—	8.1	7.4	—	YTC	MO 1630
5-22-97 3	D	22.6	—	—	8.4	8.3	—	YTC	CR 1000
5-23-97 4	E	22.5	—	—	8.4	7.8	—	YTC	MO 1130
5-24-97 5	F	22.6	—	—	8.3	8.1	—	YTC	MO 1330
5-25-97 6	G	23.7	—	—	8.4	7.6	—	YTC	JDY 1315
5-26-97 7	H	22.9	—	—	8.3	7.9	—	YTC	MO 1200
5-27-97 8	A	23.2	—	—	8.3	8.0	—	YTC	MO 1115
5-28-97 9	B	22.5	—	—	8.2	7.7	—	YTC	MO 1030
5-29-97 10	C	22.4	150/195	3.0	8.2	7.6	380	—	MO 0845

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5-19-97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1430
5-20-97 1	1 AS	N	N	N	1 AS	1 AS	1 AS	N	CR 1C8
5-21-97 2	N	N	N	N	N	N	1 AS	N	MO 163
5-22-97 3	N	N	N	N	N	N	N	N	CR 10XX
5-23-97 4	N	1 AS	N	1 AS	1 AS	N	N	N	CR 120X
5-24-97 5	N	N	N	N	N	N	N	N	MO 134
5-25-97 6	N	N	N	N	N	N	N	N	JDY 1205
5-26-97 7	N	N	N	N	N	N	N	N	MO 133
5-27-97 8	N	N	N	N	N	N	N	N	MO 113
5-28-97 9	N	N	N	N	1 AS	N	N	N	MO 1[illegible]
5-29-97 10	8A, 2NF	10A	10A, 2AMP	10A	10A 1AMP	10A 1AMP	10A	10A	MO 12[illegible]

Comments: ALGAE AT SURFACE OF OF WATER 5-20-97 CR
5/29/97 MO – Slight petroleum odor (less than 600).

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

L = LOADED [redacted]

AR300971

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F WESTON
SAMPLE ID: 403
PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. azteca

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	23.1	124/155	<0.1	7.8	7.9	330	—	CR 1100
5-20-97 1	B	22.2	—	<0.1	8.2	7.5	—	ALG/YTC	JOY 1030
5-21-97 2	C	22.7	—	—	8.3	7.6	—	YTC	MO 1630
5-22-97 3	D	22.5	—	—	8.1	8.2	—	YTC	CR 1000
5-23-97 4	E	22.5	—	—	8.2	8.2	—	YTC	MO 1130
5-24-97 5	F	22.5	—	—	8.1	8.2	—	YTC	MO 1330
5-25-97 6	G	24.~~8~~0 JY	—	—	8.1	8.0	—	YTC	JOY 1315
5-26-97 7	H	23.0	—	—	8.1	7.9	—	YTC	MO 1300
5-27-97 8	A	23.0	—	—	8.1	8.1	—	YTC	MO 1115
5-28-97 9	B	22.5	—	—	8.1	8.0	—	YTC	MO 1030
5-29-97 10	C	22.3	140/160	<0.1	8.0	7.9	380	—	MO 0845

OBSERV DATE-DAY	REPLICATE A	B	C	D	E	F	G	H	Initial
5-19-97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1430
5-20-97 1	∩	∩	∩	∩	∩	∩	∩	∩	CR 1035
5-21-97 2	N	N	N	N	N	N	N	N	MO 1630
5-22-97 3	∩	∩	∩	∩	∩	∩	∩	∩	CR 1030
5-23-97 4	∩	∩	∩	∩	∩	∩	∩	∩	MO 1200
5-24-97 5	N	N	N	N	N	N	N	N	MO 1345
5-25-97 6	N	N	N	N	N	N	N	N	JY 1205
5-26-97 7	N	N	N	N	N	N	N	N	MO 1300
5-27-97 8	N	N	N	N	N	N	N	N	MO 1130
5-28-97 9	N	N	1 EMR	1 EMR	N	1 EMR	N	N	MO 1100
5-29-97 10	9A, 1NF	10A	10A	10A 1 AMP	10A	10A 1 AMP	10A 1 AMP	9A, 1NF	MO 1330

Comments: 5/25/97 Heating coil too close to flask. Adjusted. JY 5/26/97

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL
L = LOADED

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F WESTON
SAMPLE ID: 608

PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. azteca

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (μmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	23.1	119/290	<0.1	8.9	6.3	800	—	CR 1100
5-20-97 1	B	22.5	—	—	9.1	6.9	—	ALG/YTC	JCY 1030
5-21-97 2	C	22.6	—	—	8.8	6.7	—	YTC	MO 1630
5-22-97 3	D	22.5	—	—	8.9	8.3	—	YTC	CR 1000
5-23-97 4	E	22.5	—	—	8.8	8.1	—	YTC	MO 1130
5-24-97 5	F	22.5	—	—	8.7	8.0	—	YTC	MO 1330
5-25-97 6	G	24.0	—	—	8.6	7.9	—	YTC	MO JY 1315
5-26-97 7	H	23.1	—	—	8.6	8.1	—	YTC	MO 1300
5-27-97 8	A	23.2	—	—	8.7	8.2	—	YTC	MO 1115
5-28-97 9	B	22.5	—	—	8.7	8.0	—	YTC	MO 1030
5-29-97 10	C	22.3	125/305	<0.1	8.8	7.9	880	—	MO 0845

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5-19-97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 143
5-20-97 1	1AS	N	N	N	N	N	3AS	N	CR 163
5-21-97 2	N	N	N	N	N	N	1AS	N	MO 163
5-22-97 3	N	N	N	N	N	N	N	N	CR 103
5-23-97 4	N	N	N	N	N	N	N	N	MO 120
5-24-97 5	N	N	N	N	N	N	N	N	MO 134
5-25-97 6	N	N	N	N	N	N	N	N	JY 120
5-26-97 7	N	N	N	N	N	N	N	N	MO 130
5-27-97 8	N	N	N	N	N	N	N	N	MO 113
5-28-97 9	N	N	N	N	N	N	N	N	MO 110
5-29-97 10	4A, 6NF	4A, 1D 5NF	7A, 1D 2NF	5A, 1D 4NF	6A, 2D 2NF	5A, 1D 4NF	1A 1D 8NF	3A, 2D 5NF	MO 134

Comments: 5/21/97 mo - sediment has not settled out of overlying water too well

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

L = LOADED

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F. WESTON
SAMPLE ID: 45
PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. AZTECA

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	23.0	170/141	<0.1	7.5	6.9	330	—	CR 1100
5-20-97 1	B	22.5	—	—	8.0	7.3	—	ALG/YTC	JDY 1030
5-21-97 2	C	22.6	—	—	7.9	7.1	—	YTC	MO 1630
5-22-97 3	D	22.5	—	—	7.9	7.6	—	YTC	CR 1000
5-23-97 4	E	22.2	—	—	8.0	8.2	—	YTC	MO 1130
5-24-97 5	F	22.4	—	—	8.0	8.3	—	YTC	MO 1330
5-25-97 6	G	22.9	—	—	8.0	8.0	—	YTC	JDY 1315
5-26-97 7	H	22.8	—	—	8.0	8.1	—	YTC	MO 1300
5-27-97 8	A	23.1	—	—	8.0	8.2	—	YTC	MO 1115
5-28-97 9	B	22.4	—	—	7.9	7.8	—	YTC	MO 1030
5-29-97 10	C	22.3	165/150	<0.1	8.0	7.7	365	—	MO 0845

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5-19-97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1430
5-20-97 1	1AS	2AS	N	1AS	1AS	N	N	N	CR 1035
5-21-97 2	1 DEAD	N	N	N	N	N	N	N	MO 1630
5-22-97 3	N	N	N	N	1AS	N	1AS	N	CR 1030
5-23-97 4	N	N	N	N	N	N	N	N	MO 1200
5-24-97 5	N	N	N	N	N	N	N	N	MO 1345
5-25-97 6	N	N	N	N	N	N	N	N	JDY 1205
5-26-97 7	N	N	1AS	N	N	N	N	N	MO 1300
5-27-97 8	N	1EMR	1EMR	1EMR	2EMR	N	2EMR	1EMR	MO 1130
5-28-97 9	N	N	1EMR	N	1EMR	N	1AS	N	MO 1100
5-29-97 10	7A, 2NF	10A	10A	10A	8A, 2NF	10A	8A, 2NF	7A, 3NF	MO 1400

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

L=LOADED

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108E
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F. WESTON
SAMPLE ID: 405
PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. azteca

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	23.0	162/165	0.39	7.7	6.2	330	—	CR 1100
5-20-97 1	B	22.2	—	—	8.0	7.3	—	ALG/YTC	JDY 1030
5-21-97 2	C	22.5	—	—	7.8	7.2	—	YTC	MO 1620
5-22-97 3	D	22.4	—	—	8.0	8.3	—	YTC	CR 1000
5-23-97 4	E	22.2	—	—	8.0	8.2	—	YTC	MO 1130
5-24-97 5	F	22.3	—	—	8.1	8.1	—	YTC	MO 1330
5-25-97 6	G	22.9	—	—	8.1	8.0	—	YTC	JDY 1315
5-26-97 7	H	22.9	—	—	8.0	8.2	—	YTC	MO 1300
5-27-97 8	A	23.0	—	—	7.9	8.0	—	YTC	MO 1115
5-28-97 9	B	22.4	—	—	8.0	8.1	—	YTC	MO 1030
5-29-97 10	C	22.2	170/180	0.50	7.9	7.8	355	—	MO 0848

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5-19-97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 11
5-20-97 1	N	N	N	N	N	N	N	N	CR 103
5-21-97 2	N	N	N	N	N	N	N	N	MO 162
5-22-97 3	N	N	N	1 EMR	2 AS	N	N	N	CR 103
5-23-97 4	N	N	N	N	N	N	N	N	MO 1200
5-24-97 5	N	N	N	N	N	N	N	N	MO 1345
5-25-97 6	N	N	N	N	N	N	N	N	JDY 1205
5-26-97 7	N	N	N	N	N	1 AS	N	N	MO 130
5-27-97 8	N	N	N	N	N	N	N	N	MO 112
5-28-97 9	1 EMR	N	N	1 EMR	N	N	1 EMR	1 EMR	MO 11
5-29-97 10	8A, 2NF	10A	8A, 2NF	10A	10A	10A	10A	7A, 1D, 2NF	MO 150

Comments:

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT [illegible]ND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

C=LOADED [redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F. WESTON
SAMPLE ID: #44
PROJECT NUMBER: 3197225-0100
TEST SPECIES: H. azteca

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5-19-97 0	A	22.8	149/194	<0.1	7.8	7.2	270	—	CR 1100
5-20-97 1	B	22.2	—	—	8.1	7.5	—	ALG/YTC	JDY 1030
5-21-97 2	C	22.6	—	—	8.0	7.2	—	YTC	MO 1630
5-22-97 3	D	22.4	—	—	8.1	8.4	—	YTC	CR 1000
5-23-97 4	E	22.2	—	—	8.1	8.0	—	YTC	MO 1130
5-24-97 5	F	22.4	—	—	8.0	8.2	—	YTC	MO 1330
5-25-97 6	G	22.8	—	—	8.0	8.0	—	YTC	JN 1315
5-26-97 7	H	22.9	—	—	8.0	7.7	—	YTC	MO 1300
5-27-97 8	A	23.2	—	—	8.2	7.9	—	YTC	MO 1115
5-28-97 9	B	22.4	—	—	8.1	7.9	—	YTC	MO 1030
5-29-97 10	C	22.1	155/200	<0.1	8.1	8.0	300	—	MO 0845

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5-19-97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1430
5-20-97 1	4AS	2AS	3AS	8AS	6AS	6AS	7AS	4AS	CR 1035
5-21-97 2	4AS	4AS	4AS	6AS	3AS	4AS	5AS	3AS	MO 1630
5-22-97 3	2AS	N	N	N	2AS	1AS	1AS	N	CR 1030
5-23-97 4	N	1DEAD	N	N	N	N	N	N	CR 1200
5-24-97 5	N	N	N	N	N	N	N	N	MO 1345
5-25-97 6	N	N	N	N	N	N	N	N	JDY 1205
5-26-97 7	N	1AS	N	N	2AS	N	N	N	MO 1300
5-27-97 8	N	N	N	N	N	N	N	N	MO 1130
5-28-97 9	N	N	N	N	N	N	N	N	MO 1100
5-29-97 10	7DEAD 3NF	6DEAD 3NF	9D 1NF	7D 3NF	5D, 5NF	9D, 1NF	9D, 1NF	7D, 3NF	MO 1545

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

L=LOADED

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017A
EFFECTIVE:
PROJECT NO: 3197225

SUBJECT: TEST ORGANISM SURVIVAL AND WEIGHTS

SPONSOR: ROY F. WESTON | SPECIES: H. azteca

Sample ID	Boat	Rep	No. Alive	Tare Wt (g)	Gross Wt (g)	Net Wt (mg)	Average
	1	A	5	0.9179	0.9188	0.9 / 0.18	
	2	B	10	0.9159	0.9177	1.8 / 0.18	
	3	C	10	0.9179	0.9198	1.9 / 0.19	
CONTROL	4	D	9	0.9219	0.9237	1.8 / 0.20	0.19
	5	E	10	0.9230	0.9250	2.0 / 0.20	mg/org
	6	F	10	0.9215	0.9234	1.9 / 0.19	
	7	G	10	0.9192	0.9208	1.6 / 0.16	
	8	H	10	0.9179	0.9197	1.8 / 0.18	
	9	A	10	0.9214	0.9244	3.0 / 0.30	
	10	B	10	0.9253	0.9282	2.9 / 0.29	
404	11	C	10	0.9315	0.9355	4.0 / 0.40	
	12	D	10	0.9364	0.9395	3.1 / 0.31	0.34
	13	E	10	0.9326	0.9360	3.4 / 0.34	mg/org
	14	F	10	0.9301	0.9336	3.5 / 0.35	
	15	G	10	0.9312	0.9349	3.7 / 0.37	
	16	H	10	0.9312	0.9348	3.6 / 0.36	
	17	A	10	0.9274	0.9304	3.0 / 0.30	
	18	B	10	0.9192	0.9223	3.1 / 0.31	
407	19	C	10	0.9128	0.9156	2.8 / 0.28	0.29
	20	D	10	0.9222	0.9255	3.3 / 0.33	
	21	E	9	0.9313	0.9338	2.5 / 0.28	mg/org
	22	F	10	0.9311	0.9342	3.1 / 0.31	
	23	G	10	0.9190	0.9212	2.2 / 0.22	
	24	H	10	0.9285	0.9313	2.8 / 0.28	

Balance Used: SP180 Calculator Used: TI-60 By: MO Date: 6-3-97

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017A
EFFECTIVE:
PROJECT NO: 3197225

SUBJECT: TEST ORGANISM SURVIVAL AND WEIGHTS

SPONSOR: ROY F WESTON | SPECIES: H. azteca

Sample ID	Boat	Rep	No. Alive	Tare Wt (g)	Gross Wt (g)	Net Wt (mg)	Average
402 ~~607~~ ®	25	A	10	0.9348	0.9374	2.6/0.26	0.25 mg/org
	26	B	10	0.9297	0.9315	1.8/0.18	
	27	C	10	0.9333	0.9359	2.6/0.26	
	28	D	10	0.9154	0.9175	2.1/0.21	
	29	E	10	0.9177	0.9198	2.1/0.21	
	30	F	10	0.9242	0.9265	2.3/0.23	
	31	G	9	0.9316	0.9341	2.5/0.28	
	32	H	10	0.9386	0.9422	3.6/0.36	
607 ~~410~~ ®	33	A	10	0.9298	0.9321	2.3/0.23	0.18 mg/org
	34	B	10	0.9299	0.9318	1.9/0.19	
	35	C	10	0.9283	0.9295	1.2/0.12	
	36	D	9	0.9229	0.9241	1.2/0.13	
	37	E	10	0.9192	0.9211	1.9/0.19	
	38	F	9	0.9182	0.9199	1.7/0.19	
	39	G	8	0.9197	0.9214	1.7/0.21	
	40	H	7	0.9194	0.9207	1.3/0.19	
410 ~~606~~ ®	41	A	10	0.9241	0.9254	1.3/0.13	0.18 mg/org
	42	B	10	0.9315	0.9334	1.9/0.19	
	43	C	10	0.9388	0.9406	1.8/0.18	
	44	D	10	0.9249	0.9261	1.2/0.12	
	45	E	10	0.9275	0.9292	1.7/0.17	
	46	F	10	0.9282	0.9299	1.7/0.17	
	47	G	10	0.9311	0.9336	2.5/0.25	
	48	H	10	0.9340	0.9363	2.3/0.23	

Balance Used: SP180 Calculator Used: TI-60 By: MO Date: 6/4/97

® mo 5/28/97 (wp)

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Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017A
EFFECTIVE:
PROJECT NO:

SUBJECT: TEST ORGANISM SURVIVAL AND WEIGHTS

SPONSOR: ROY F WESTON | SPECIES: H. azteca

Sample ID	Boat	Rep	No. Alive	Tare Wt (g)	Gross Wt (g)	Net Wt (mg)	Average
606	49	A	5	0.9293	0.9298	0.5/0.10	0.14 mg/org
	50	B	9	0.9297	0.9307	1.0/0.11	
	51	C	2	0.9280	0.9282	0.2/0.10	
	52	D	6	0.9290	0.9300	1.0/0.17	
	53	E	5	0.9261	0.9267	0.6/0.12	
	54	F	10	0.9301	0.9316	1.5/0.15	
	55	G	1	0.9294	0.9296	0.2/0.20	
	56	H	4	0.9266	0.9272	0.6/0.15	
605	57	A	8	0.9293	0.9307	1.4/0.18	0.22 mg/org
	58	B	10	0.9324	0.9343	1.9/0.19	
	59	C	10	0.9319	0.9342	2.3/0.23	
	60	D	10	0.9332	0.9354	2.2/0.22	
	61	E	10	0.9259	0.9279	* ~~2.0~~ 2.0/0.20	* [illegible]
	62	F	10	0.9281	0.9304	2.3/0.23	
	63	G	10	0.9391	0.9411	2.0/0.20	
	64	H	10	0.9195	0.9224	2.9/0.29	
403	65	A	9	0.9232	0.9245	1.3/0.14	0.17 mg/org
	66	B	10	0.9197	0.9209	1.2/0.12	
	67	C	10	0.9180	0.9201	2.1/0.21	
	68	D	10	0.9277	0.9292	1.5/0.15	
	69	E	10	0.9254	0.9277	2.3/0.23	
	70	F	10	0.9269	0.9284	1.5/0.15	
	71	G	10	0.9285	0.9303	1.8/0.18	
	72	H	9	0.9293	0.9310	1.7/0.19	

Balance Used: SP180 Calculator Used: TI-60 By: MO Date: 6/4/97 6/5/97

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017A
EFFECTIVE:
PROJECT NO:

SUBJECT: TEST ORGANISM SURVIVAL AND WEIGHTS

SPONSOR: ROY F WESTON   SPECIES: H. azteca

Sample ID	Boat	Rep	No. Alive	Tare Wt (g)	Gross Wt (g)	Net Wt (mg)	Average
608	73	A	4	0.9320	0.9324	0.4/0.10	0.15 mg/org
	74	B	4	0.9304	0.9312	0.8/0.20	
	75	C	7	0.9295	0.9305	1.0/0.14	
	76	D	5	0.9250	0.9256	0.6/0.12	
	77	E	6	0.9217	0.9228	1.1/0.18	
	78	F	5	0.9234	0.9241	0.7/0.14	
	79	G	1	0.9277	0.9278	0.1/0.10	
	80	H	3	0.9297	0.9303	0.6/0.20	
45	81	A	7	0.9194	0.9209	1.5/0.21	0.17 mg/org
	82	B	10	0.9218	0.9233	1.5/0.15	
	83	C	10	0.9254	0.9271	1.7/0.17	
	84	D	10	0.9312	0.9331	1.9/0.19	
	85	E	8	0.9297	0.9308	1.1/0.14	
	86	F	10	0.9287	0.9305	1.8/0.18	
	87	G	8	0.9284	0.9298	1.4/0.18	
	88	H	7	0.9267	0.9277	1.0/0.14	
405	89	A	8	0.9182	0.9197	1.5/0.19	0.20 mg/org
	90	B	10	0.9116	0.9135	1.9/0.19	
	91	C	8	0.9100	0.9113	1.3/0.16	
	92	D	10	0.9114	0.9133	1.9/0.19	
	93	E	10	0.9102	0.9122	2.0/~~2.0~~ 0.20	mo [illegible]
	94	F	10	0.9068	0.9089	2.1/0.21	
	95	G	10	0.9072	0.9097	2.5/0.25	
	96	H	7	0.9046	0.9062	1.6/0.23	

Balance Used: SP180 Calculator Used: TI-60 By: MO Date: 6/5/97

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017A
EFFECTIVE:
PROJECT NO:

SUBJECT: TEST ORGANISM SURVIVAL AND WEIGHTS							
SPONSOR: Roy F Weston				SPECIES: H. azteca			
Sample ID	Boat	Rep	No. Alive	Tare Wt (g)	Gross Wt (g)	Net Wt (mg)	Average
44	97	A	0	0.9040			
	98	B	0	0.9378			
	99	C	0	0.9392			
	100	D	0	0.9289			—
	101	E	0	0.9316			
	102	F	0	0.9135			
	103	G	0	0.9117			
	104	H	0	0.9147			
		A					
		B					
		C					
		D					
		E					
		F					
		G					
		H					
		A					
		B					
		C					
		D					
		E					
		F					
		G					
		H					

Balance Used: SP180 Calculator Used: TI-60 By: Date:

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: ROY F WESTON | SAMPLE ID: Control

PROJECT NUMBER: 3197225-0100 | TEST SPECIES: H. azteca

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	3.3	1	B	2.9	1	C	3.4	1	D	3.4
2		3.5	2		3.4	2		2.7	2		2.9
3		2.8	3		2.8	3		2.9	3		3.0
4		2.9	4		2.6	4		2.9	4		2.7
5		2.9	5		3.0	5		3.5	5		3.2
–		–	6		3.1	6		2.9	6		28
–		–	7		3.3	7		28	7		2.7
–		–	8		2.9	8		2.8	8		2.7
–		–	9		3.0	9		3.4	9		3.6
–		–	10		2.8	10		3.1	—		—
AVERAGE STD. DEV. RANGE		3.1 0.30 2.8-3.5	AVERAGE STD. DEV. RANGE		3.0 0.24 2.6-3.4	AVERAGE STD. DEV. RANGE		3.0 0.29 2.7-3.5	AVERAGE STD. DEV. RANGE		3.0 0.33 2.7-3.6
1	E	2.9	1	F	3.3	1	G	3.4	1	H	3.0
2		2.7	2		29	2		3.6	2		34
3		3.5	3		2.6	3		3.0	3		2.7
4		2.8	4		3.1	4		2.8	4		2.5
5		3.2	5		2.9	5		3.1	5		2.6
6		3.3	6		3.2	6		2.8	6		3.0
7		26	7		2.7	7		3.1	7		2.0
8		3.2	8		3.0	8		2.9	8		2.9
9		3.0	9		3.8	9		3.0	9		3.1
10		3.1	10		2.7	10		2.9	10		2.9
AVERAGE STD. DEV. RANGE		3.0 0.28 2.6-3.5	AVERAGE STD. DEV. RANGE		3.0 0.36 2.6-3.8	AVERAGE STD. DEV. RANGE		3.1 0.26 2.8-3.6	AVERAGE STD. DEV. RANGE		2.8 0.38 2.0-3.4

Measuring Device: Micrometer | Calculator: RS-QA6

Data By: MO Date: 6/02/97 | Reviewed By: Date:

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE: -

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: ROY F WESTON | SAMPLE ID: 404

PROJECT NUMBER: 3197225-0100 | TEST SPECIES: H. azteca

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	3.2	1	B	3.0	1	C	3.3	1	D	3.1
2		3.9	2		2.8	2		3.1	2		3.7
3		3.8	3		3.2	3		3.8	3		3.6
4		4.0	4		4.1	4		3.9	4		3.6
5		3.5	5		3.6	5		3.8	5		4.1
6		3.0	6		3.2	6		3.9	6		3.4
7		3.7	7		3.6	7		3.7	7		3.9
8		3.1	8		4.1	8		4.0	8		3.3
9		3.9	9		2.7	9		3.7	9		3.4
10		3.6	10		3.5	10		4.0	10		2.7
AVERAGE STD. DEV. RANGE		3.6 0.36 3.0-4.0	AVERAGE STD. DEV. RANGE		3.4 0.49 2.7-4.1	AVERAGE STD. DEV. RANGE		3.7 0.30 3.1-4.0	AVERAGE STD. DEV. RANGE		3.5 0.40 2.7-4.1

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	E	3.6	1	F	2.9	1	G	3.9	1	H	3.4
2		3.1	2		2.7	2		3.5	2		3.0
3		3.0	3		3.0	3		3.7	3		4.1
4		3.4	4		3.8	4		3.4	4		3.0
5		3.9	5		3.0	5		3.5	5		3.3
6		3.2	6		3.4	6		3.5	6		3.2
7		3.4	7		3.3	7		3.2	7		3.4
8		2.8	8		3.2	8		3.0	8		2.5
9		3.8	9		3.5	9		3.3	9		3.4
10		3.3	10		3.4	10		3.7	10		3.7
AVERAGE STD. DEV. RANGE		3.4 0.35 2.8-3.9	AVERAGE STD. DEV. RANGE		3.2 0.33 2.7-3.8	AVERAGE STD. DEV. RANGE		3.5 0.26 3.0-3.9	AVERAGE STD. DEV. RANGE		3.3 0.43 2.5-4.1

Measuring Device: Micrometer | Calculator: RS-DATE

Data By: MO Date: 6/2/97 | Reviewed By: Date:

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH											
SPONSOR: ROY F WESTON						SAMPLE ID: 407					
PROJECT NUMBER: 3197225						TEST SPECIES: H. azteca					
ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	2.9	1	B	3.3	1	C	3.5	1	D	3.3
2		3.2	2		2.9	2		3.7	2		3.0
3		2.8	3		3.9	3		3.1	3		3.4
4		3.5	4		3.6	4		3.3	4		3.3
5		3.7	5		3.6	5		3.3	5		3.7
6		3.4	6		3.2	6		3.1	6		3.6
7		3.1	7		2.6	7		3.7	7		3.0
8		3.0	8		3.1	8		2.7	8		3.2
9		2.9	9		3.3	9		3.6	9		3.6
10		2.9	10		3.6	10		3.7	10		4.0
AVERAGE STD. DEV. RANGE		3.1 0.30 2.8-3.7	AVERAGE STD. DEV. RANGE		3.3 0.38 2.6-3.9	AVERAGE STD. DEV. RANGE		3.4 0.33 2.7-3.7	AVERAGE STD. DEV. RANGE		3.4 0.32 3.0-4.0
1	E	3.7	1	F	3.5	1	G	3.3	1	H	3.4
2		3.3	2		3.0	2		3.0	2		3.1
3		3.3	3		3.4	3		3.8	3		3.4
4		3.4	4		3.3	4		2.6	4		3.2
5		3.8	5		2.9	5		3.0	5		3.2
6		3.3	6		2.9	6		3.4	6		2.7
7		2.9	7		3.2	7		2.6	7		2.6
8		3.5	8		3.2	8		3.0	8		3.1
9		3.1	9		3.2	9		3.5	9		3.5
–		–	10		3.1	10		2.7	10		3.4
AVERAGE STD. DEV. RANGE		3.4 0.28 2.9-3.8	AVERAGE STD. DEV. RANGE		3.2 0.20 2.9-3.5	AVERAGE STD. DEV. RANGE		3.1 0.40 2.6-3.8	AVERAGE STD. DEV. RANGE		3.2 0.30 2.6-3.5
Measuring Device: Micrometer						Calculator: RS-DAE					
Data By: MO				Date: 6/2/97		Reviewed By:				Date:	

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: ROY F WESTON | SAMPLE ID: 402

PROJECT NUMBER: 3197225-0100 | TEST SPECIES: H. azteca

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	3.0	1	B	3.1	1	C	3.3	1	D	3.7
2		3.4	2		3.5	2		2.7	2		3.2
3		3.4	3		3.3	3		4.0	3		3.8
4		3.3	4		2.7	4		2.8	4		3.3
5		2.9	5		3.6	5		3.2	5		3.9
6		3.1	6		3.4	6		3.9	6		2.9
7		3.1	7		3.0	7		3.5	7		3.1
8		3.2	8		3.1	8		3.6	8		3.7
9		3.2	9		3.4	9		4.0	9		2.8
10		3.3	10		3.6	10		3.0	10		2.9
AVERAGE STD. DEV. RANGE		3.2 0.17 2.9-3.4	AVERAGE STD. DEV. RANGE		3.3 0.29 2.7-3.6	AVERAGE STD. DEV. RANGE		3.4 0.48 2.7-4.0	AVERAGE STD. DEV. RANGE		3.3 0.41 2.8-3.9
1	E	3.9	1	F	2.7	1	G	3.1	1	H	3.9
2		2.8	2		3.1	2		4.1	2		3.2
3		3.0	3		3.4	3		3.7	3		3.9
4		3.1	4		3.0	4		3.3	4		3.3
5		3.3	5		3.4	5		3.4	5		3.5
6		3.4	6		2.9	6		3.7	6		3.1
7		2.7	7		3.5	7		3.3	7		4.0
8		3.5	8		2.9	8		3.2	8		4.1
9		2.9	9		2.6	9		3.1	9		3.4
10		3.7	10		3.5	—		—	10		2.7
AVERAGE STD. DEV. RANGE		3.2 0.40 2.7-3.9	AVERAGE STD. DEV. RANGE		3.1 0.33 2.6-3.5	AVERAGE STD. DEV. RANGE		3.4 0.34 3.1-4.1	AVERAGE STD. DEV. RANGE		3.5 0.46 2.7-4.1

Measuring Device: Micrometer | Calculator: RS-DAE

Data By: MO Date: 6/3/97 | Reviewed By: Date:

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: ROY F WESTON

SAMPLE ID: 607

PROJECT NUMBER: 3197225-0100

TEST SPECIES: H. azteca

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	3.0	1	B	2.8	1	C	2.9	1	D	3.2
2		2.9	2		2.9	2		2.9	2		3.3
3		3.5	3		3.1	3		2.5	3		3.0
4		3.4	4		3.1	4		3.6	4		3.3
5		2.8	5		3.3	5		3.4	5		2.6
6		3.4	6		2.9	6		2.7	6		2.9
7		3.1	7		3.0	7		2.6	7		2.8
8		2.6	8		3.1	8		2.9	8		2.7
9		3.3	9		2.8	9		3.0	9		2.9
10		2.8	10		3.2	10		2.9	—		—
AVERAGE STD. DEV. RANGE		3.1 0.31 2.6-3.5	AVERAGE STD. DEV. RANGE		3.0 0.17 2.8-3.3	AVERAGE STD. DEV. RANGE		2.9 0.34 2.5-3.6	AVERAGE STD. DEV. RANGE		3.0 0.26 2.6-3.3
1	E	2.8	1	F	2.8	1	G	2.9	1	H	3.2
2		2.8	2		3.2	2		2.5	2		3.3
3		3.1	3		2.9	3		3.2	3		2.9
4		2.8	4		3.2	4		2.8	4		2.4
5		3.0	5		2.8	5		3.1	5		2.7
6		3.3	6		3.5	6		3.3	6		2.7
7		3.0	7		3.1	7		3.7	7		3.5
8		3.0	8		2.7	8		3.0	—		—
9		3.1	9		2.6	—		—	—		—
10		2.7	—		—	—		—	—		—
AVERAGE STD. DEV. RANGE		3.0 0.18 2.7-3.1	AVERAGE STD. DEV. RANGE		3.0 0.29 2.6-3.5	AVERAGE STD. DEV. RANGE		3.1 0.36 2.5-3.7	AVERAGE STD. DEV. RANGE		3.0 0.39 2.4-3.5

Measuring Device: Micrometer

Calculator: RS-DAE

Data By: MO Date: 6/3/97

Reviewed By: Date:

[redacted]

AR300986

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: Roy F Weston | SAMPLE ID: 410

PROJECT NUMBER: 3197225-0100 | TEST SPECIES: H. azteca

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	3.5	1	B	2.8	1	C	2.9	1	D	2.7
2		2.7	2		3.2	2		3.1	2		2.2
3		3.4	3		2.4	3		3.1	3		2.2
4		2.9	4		3.1	4		3.2	4		3.0
5		2.7	5		2.9	5		3.0	5		2.8
6		3.1	6		3.0	6		3.0	6		2.7
7		2.7	7		2.9	7		3.0	7		3.2
8		2.8	8		3.2	8		2.8	8		3.1
9		2.6	9		2.9	9		2.6	9		3.5
10		3.1	10		3.7	10		3.7	10		3.4
AVERAGE STD. DEV. RANGE		3.0 0.31 2.6-3.5	AVERAGE STD. DEV. RANGE		3.0 0.33 2.4-3.7	AVERAGE STD. DEV. RANGE		3.0 0.29 2.6-3.7	AVERAGE STD. DEV. RANGE		2.9 0.45 2.2-3.5
1	E	3.3	1	F	2.6	1	G	3.2	1	H	2.9
2		3.1	2		2.8	2		2.9	2		3.4
3		2.4	3		2.9	3		3.0	3		3.4
4		3.0	4		2.9	4		2.8	4		3.5
5		3.2	5		3.0	5		3.4	5		2.6
6		2.9	6		3.2	6		3.0	6		2.7
7		3.0	7		3.0	7		2.7	7		3.3
8		3.0	8		2.9	8		2.9	8		2.9
9		2.9	9		3.6	9		3.0	9		2.6
10		3.0	10		2.7	10		3.3	10		2.5
AVERAGE STD. DEV. RANGE		3.0 0.24 2.4-3.3	AVERAGE STD. DEV. RANGE		3.0 0.28 2.6-3.6	AVERAGE STD. DEV. RANGE		3.0 0.22 2.7-3.4	AVERAGE STD. DEV. RANGE		3.0 0.39 2.5-3.5

Measuring Device: Micrometer | Calculator: RS-DAE

Data By: MO Date: 6/3/97 | Reviewed By: Date:

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: Roy F Weston | SAMPLE ID: 606

PROJECT NUMBER: 3197225-0100 | TEST SPECIES: H. azteca

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	2.6	1	B	2.6	1	C	3.0	1	D	2.5
2		2.5	2		2.2	2		2.4	2		2.3
3		2.5	3		2.4	—		—	3		2.4
4		2.8	4		2.3	—		—	4		2.5
5		2.9	5		2.6	—		—	5		3.0
—		—	6		2.7	—		—	6		2.6
—		—	7		2.8	—		—	—		—
—		—	8		2.2	—		—	—		—
—		—	9		2.0	—		—	—		—
—		—	—		—	—		—	—		—
AVERAGE STD. DEV. RANGE		2.7 0.18 2.5-2.9	AVERAGE STD. DEV. RANGE		2.4 0.27 2.0-2.8	AVERAGE STD. DEV. RANGE		2.7 0.42 2.4-3.0	AVERAGE STD. DEV. RANGE		2.6 0.24 2.3-3.0
1	E	2.4	1	F	2.3	1	G	2.4	1	H	2.4
2		3.0	2		2.5	—		—	2		2.8
3		3.1	3		3.0	—		—	3		3.0
4		3.3	4		2.5	—		—	4		2.3
5		2.9	5		2.9	—		—	—		—
—		—	6		2.9	—		—	—		—
—		—	7		3.0	—		—	—		—
—		—	8		2.9	—		—	—		—
—		—	9		2.8	—		—	—		—
—		—	10		2.2	—		—	—		—
AVERAGE STD. DEV. RANGE		2.9 0.34 2.4-3.3	AVERAGE STD. DEV. RANGE		2.7 0.30 2.2-3.0	AVERAGE STD. DEV. RANGE		2.4 — —	AVERAGE STD. DEV. RANGE		2.6 0.33 2.3-3.0

Measuring Device: Micrometer | Calculator: RS-DAE

Data By: MO Date: 6/3/97 | Reviewed By: Date:

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: Roy F. Weston | SAMPLE ID: 605

PROJECT NUMBER: 3197225-0100 | TEST SPECIES: H. azteca

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	2.7	1	B	3.0	1	C	3.4	1	D	2.5
2		2.6	2		3.0	2		3.3	2		3.2
3		3.5	3		3.4	3		3.9	3		2.8
4		3.1	4		3.5	4		3.5	4		3.4
5		3.0	5		3.2	5		3.3	5		3.4
6		3.3	6		3.2	6		3.4	6		2.2
7		3.7	7		3.3	7		2.8	7		3.1
8		3.3	8		2.4	8		3.4	8		3.6
—		—	9		3.0	9		3.0	9		3.4
—		—	10		3.5	10		3.1	10		3.0
AVERAGE STD. DEV. RANGE		3.2 0.38 2.6-3.7	AVERAGE STD. DEV. RANGE		3.2 0.33 2.4-3.5	AVERAGE STD. DEV. RANGE		3.3 0.30 2.8-3.9	AVERAGE STD. DEV. RANGE		3.1 0.45 2.2-3.6
1	E	3.0	1	F	3.2	1	G	3.6	1	H	3.2
2		3.0	2		3.3	2		3.1	2		4.0
3		3.1	3		3.7	3		3.3	3		4.0
4		3.0	4		3.5	4		3.5	4		3.8
5		3.6	5		3.0	5		3.7	5		3.0
6		3.3	6		3.1	6		2.9	6		2.5
7		3.5	7		3.0	7		3.5	7		3.6
8		2.6	8		3.0	8		2.6	8		3.9
9		2.3	9		3.8	9		3.1	9		3.9
10		2.9	10		2.9	10		3.2	10		2.5
AVERAGE STD. DEV. RANGE		3.0 0.39 2.3-3.6	AVERAGE STD. DEV. RANGE		3.3 0.32 2.9-3.8	AVERAGE STD. DEV. RANGE		3.3 0.34 2.6-3.7	AVERAGE STD. DEV. RANGE		3.4 0.60 2.5-4.0

Measuring Device: Micrometer | Calculator: RS-DAE

Data By: MO | Date: 6/4/99 | Reviewed By: | Date:

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: Roy F. Weston						SAMPLE ID: 403					
PROJECT NUMBER: 3197225-0100						TEST SPECIES: H. azteca					
ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	2.5	1	B	2.5	1	C	3.3	1	D	2.9
2		2.6	2		3.3	2		3.0	2		2.5
3		3.1	3		3.0	3		2.8	3		3.4
4		2.8	4		2.4	4		3.0	4		3.0
5		2.5	5		3.0	5		3.3	5		2.6
6		3.0	6		2.9	6		2.7	6		2.9
7		3.6	7		2.8	7		2.6	7		2.9
8		3.0	8		3.3	8		3.1	8		3.4
9		3.3	9		2.8	9		3.6	9		3.2
—		—	10		2.4	10		3.2	10		3.3
AVERAGE STD. DEV. RANGE		3.0 0.38 2.5-3.6	AVERAGE STD. DEV. RANGE		2.8 0.33 2.4-3.3	AVERAGE STD. DEV. RANGE		3.1 0.31 2.6-3.6	AVERAGE STD. DEV. RANGE		3.0 0.31 2.5-3.4
1	E	3.0	1	F	2.7	1	G	2.7	1	H	3.1
2		3.2	2		3.1	2		3.0	2		3.2
3		3.2	3		2.7	3		3.1	3		3.0
4		3.3	4		2.0	4		3.2	4		3.3
5		3.8	5		2.9	5		2.9	5		3.8
6		2.5	6		2.7	6		3.2	6		3.0
7		2.4	7		3.4	7		3.5	7		3.1
8		3.0	8		3.4	8		3.0	8		2.9
9		3.0	9		3.0	9		3.5	9		3.2
10		3.4	10		3.1	10		3.1	—		—
AVERAGE STD. DEV. RANGE		3.1 0.41 2.4-3.8	AVERAGE STD. DEV. RANGE		2.9 0.41 2.0-3.4	AVERAGE STD. DEV. RANGE		3.1 0.25 2.7-3.5	AVERAGE STD. DEV. RANGE		3.1 0.18 2.9-3.5
Measuring Device: Micrometer						Calculator: RS-DAE					
Data By: MO				Date: 6/4/97		Reviewed By:				Date:	

[redacted]

AR300990

Appendix D: Reference Toxicant Test Raw Data

[redacted]

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
ESE QA FORM: 097SDS
Effective: January 1993

SUBJECT: REFERENCE TOXICANT TEST DATA SHEET

Client: misc

Project Number:

Test Material

Amount ~~SDS~~ $CdCl_2$: 0.0165 g
Volume of Milli-Q Water: 1000 mL
Date Prepared: ____

Test Conditions

[X] Definitive
[ ] Screening
[X] Static
Duration: 96 hours.

Test Animal History

Species: H. azteca
Batch Number: 97-35
Age / Life Stage: 2-4 mm (juvenile)
Date Acclimation / Maintenance Began: 5/17/97
See Page 178 of Invertebrate Holding Log for raw data.
Mortality (%) 48 Hrs prior to testing: 0 %

Dilution Water: Hard water

Lighting: [ ] Fluorescent [ ] Incandescent
Photoperiod: 16 hr Light : 8 hr Dark

Test Container Dimensions (mm): 100 L x – W x 50 H
Test Solution Height: 4 cm
Test Containers: [ ] Open [X] Covered
Test Container Volume: 0.34 Liters
Diluent Volume: 0.25 Liters

Reps / Concentration: 1
Animals / Replicate: 10

Test Area Used	Temperature (C)	Salinity (ppt)
	20 +/- 1	+/-

Protocol Followed: SOP-A-004

Concentrations Based on: [ ] A.I. [ ] W.M.

Container Composition: [ ] Glass [ ] Plastic

Test Concentrations: (Units = ~~mg~~ ug/L):	Control	8	16	32	64	128		
Amount Dilution Water Added (mL):	250	249.8	249.6	249.2	248.4	246.8		
Amount SDS Stock Added (mL):	N/A	0.2	0.4	0.8	1.6	3.2		

Additional Observations: ____

Data By: ____ Date: ____

FORM: SDS93

AR300992

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
ESE QA Form No.: 097 SDS
Effective: APR 1993

REFERENCE TOXICANT TEST DATA: DAY 0 and 1

Client: MRSG | Project Number: | Species: H. azteca

Date: 5-21-97 | Day: 0
Time: 1715 | Analyst: MO

Nominal Concentration mg/L	# Alive	Obs.	Temp.(C)	Sal.(ppt)	D.O.(mg/L)	pH
Control	10	N	20.8	—	8.1	7.9
8	10	N	—	—	—	—
16	9	N	—	—	—	—
32	6	2Dead	—	—	—	—
64	5	5Dead	—	—	—	—
128	0	1Dead	—	—	7.5	8.0

Date: 5-22-97 | Day: 1
Time: 1330 | Analyst: CR

Nominal Concentration mg/L	# Alive	Obs.	Temp.(C)	Sal.(ppt)	D.O.(mg/L)	pH
Control	10	n	20.6	—	8.0	7.9
8	10	n	—	—	—	—
16	8	1DEAD	—	—	—	—
32	0	6DEAD	—	—	—	—
64	0	5DEAD	—	—	—	—
—	—	—	—	—	—	—

AR300993

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
ESE QA Form No.: 097 SDS
Effective: APR 1993

REFERENCE TOXICANT TEST DATA: FINAL DAY						
Client: misc		Project Number:			Species: H. azteca	
Nominal Concentration ug/L	Date: 5-23-97			Day: 2		
	Time: 1200			Analyst: OR		
	# Alive	Obs.	Temp.(C)	Sal.(ppt)	D.O.(mg/L)	pH
Control	10	n	21.0	—	7.9	7.9
8	10	n	—	—	—	—
16	6	2 Dead	—	—	—	—
32	—	—	—	—	—	—
64	—	—	—	—	—	—
128	—		—	—	—	—

FINAL RESULTS

Nominal Concentration ug/L	Number Dead
Control	0
8	0
16	4
32	10
64	10
128	10

[redacted]

AR300994

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ______
ESE QA FORM: 097SDS
Effective: January 1993

SUBJECT: REFERENCE TOXICANT TEST DATA SHEET

Client: | Project Number:

Test Material

Amount ~~SDS~~ $CaCl_2$: 0.0165 g
Volume of Milli-Q Water: 1000 mL
Date Prepared: 5/22/97

Test Conditions

[X] Definitive [X] Static
[ ] Screening Duration : 96 hours

Test Animal History

Species : C. tentans
Batch Number : 97-38
Age / Life Stage : 2nd instar
Date Acclimation / Maintenance Began : 5/21/97
See Page 180 of Invertebrate Hold. Log for raw data.
Mortality (%) 48 Hrs prior to testing: <1 %

Test Area Used	Temperature (C)	Salinity (ppt)
Waterbath 2	20 +/- 1	NA +/-

Dilution Water: moderately Hard Recon water

Lighting : [X] Fluorescent [ ] Incandescent
Photoperiod : 16 hr Light : 8 hr Dark

Test Container Dimensions: 100 L x ___ W x 56 H
Test Solution Height : 4 cm
Test Containers : [ ]Open [ ]Covered
Test Container Volume : 0.34 Liters
Diluent Volume : 0.25 Liters

Reps / Concentration : 1
Animals / Replicate : 10

Protocol Followed: SOP-A-004

Concentrations Based on: [ ] A.I. [X] W.M.

Container Composition: [X] Glass [ ] Plastic

Test Concentrations: (Units = ~~m~~ mg/L):	Control	125	250	500	1000	2000		
Amount Dilution Water Added (mL):	250	246.87	243.75	237.5	225	200		
Amount SDS Stock Added (mL):	N/A	3.13	6.25	12.5	25	50		

Additional Observations: ______

Data By: MD Date: 5/22/97

FORM: SD393

AR300995

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
ESE QA Form No.: 097 SDS
Effective: APR 1993

REFERENCE TOXICANT TEST DATA: DAY 0 and 1

Client: MISC | Project Number: | Species: C.tentans

Date: 5-22-97 | Day: 0
Time: 1400 | Analyst: CR

Nominal Concentration Mg/L	# Alive	Obs.	Temp.(C)	Sal.(ppt)	D.O.(mg/L)	pH
Control	10	n	20.5	—	8.1	8.0
125	10	n	—	—	—	—
250	10	n	—	—	—	—
500	10	n	—	—	—	—
1000	10	n	—	—	—	—
2000	10	n	—	—	—	—

Date: 5-23-97 | Day: 1
Time: 1200 | Analyst: CR

Nominal Concentration Mg/L	# Alive	Obs.	Temp.(C)	Sal.(ppt)	D.O.(mg/L)	pH
Control	8	2 DEAD	20.9	—	8.0	7.8
125	10	n	—	—	—	—
250	10	n	—	—	—	—
500	9	1 DEAD	—	—	—	—
1000	9	1 DEAD	—	—	—	—
2000	1	9 DEAD	—	—	—	—

[redacted]

AR300996

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ____
ESE QA Form No.: 097 SDS
Effective: APR 1993

REFERENCE TOXICANT TEST DATA: DAY 0 and 1

Client: MBG	Project Number: Ref TOX	Species: C. tentans

Nominal Concentration µg/L	Date: 5-24-97		Day: 0			
	Time: 1330		Analyst: MO			
	# Alive	Obs.	Temp.(C)	Sal.(ppt)	D.O.(mg/L)	pH
Control	8	N	20.7	—	7.9	7.9
125	10	N	—	—	—	—
250	10	N	—	—	—	—
500	7	2 Dead	—	—	—	—
1000	3	5 Dead	—	—	—	—
2000	0	1 Dead	—	—	7.2	7.8

Nominal Concentration µg/L	Date: 5/25/97		Day: 1			
	Time: 1330		Analyst: MO			
	# Alive	Obs.	Temp.(C)	Sal.(ppt)	D.O.(mg/L)	pH
Control	8	N	20.5	—	7.8	8.0
125	10	N	—	—	—	—
250	10	N	—	—	—	—
500	5	2 Dead	—	—	—	—
1000	3	N	—	—	—	—
2000	—	—	—	—	—	—

AR300997

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ___
ESE QA Form No.: 097 SDS
Effective: APR 1993

REFERENCE TOXICANT TEST DATA: FINAL DAY

Client: Misc.	Project Number: Ref Tox	Species: C. tentans

Nominal Concentration Mg/L	Date: 5-26-97		Day: 2			
	Time: 1330		Analyst: MO			
	# Alive	Obs.	Temp.(C)	Sal.(ppt)	D.O.(mg/L)	pH
Control	8	N	20.8	—	7.8	8.0
125	10	N	—	—	—	—
250	10	N	—	—	—	—
500	4	1 Dead	—	—	—	—
1000	1	2 Dead	—	—	7.8	7.9
—	—	—	—	—	—	—

FINAL RESULTS

Nominal Concentration Mg/L	Number Dead
Control	2
125	0
250	0
500	6
1000	9
2000	10

[redacted]

TRIMMED SPEARMAN-KARBER METHOD. VERSION 1.5

DATE: May 23, 1997   TEST NUMBER: 1   DURATION: 96 h
TOXICANT : CdCl2
SPECIES: H. azteca

RAW DATA:	Concentration (ug/L)	Number Exposed	Mortalities
	.00	10	0
	8.00	10	0
	16.00	10	4
	32.00	10	10
	64.00	10	10
	128.00	10	10

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: 17.15
95% LOWER CONFIDENCE: 13.83
95% UPPER CONFIDENCE: 21.26

TRIMMED SPEARMAN-KARBER METHOD. VERSION 1.5

DATE: May 26, 1997   TEST NUMBER: 2   DURATION: 96 h
TOXICANT : CdCl2
SPECIES: C. tentans

RAW DATA:	Concentration (µg/L)	Number Exposed	Mortalities
	.00	10	2
	125.00	10	0
	250.00	10	0
	500.00	10	6
	1000.00	10	9
	2000.00	10	10

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: 512.53
95% LOWER CONFIDENCE: 396.84
95% UPPER CONFIDENCE: 661.95

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING.
ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.

[redacted]

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Reference Toxicant Control Chart
Reference Toxicant: Cadmium chloride
Species: Hyalella azteca

Run by:
Date:

Test No.	LC50(ug/L)	Date
5	17.2	May97
4	30.9	Jan97
3	29.9	July96
2	22.6	Mar96
1	21.7	May95

Mean LC50(mg/L): 24.5 mg/L

Two X Standard Deviation: 10.4

Environmental Science & Engineering DATE 05/30/97 STATUS : PAGE 1
PROJECT NUMBER 1297323V L202 PROJECT NAME TOC FOR BIOASSAY
FIELD GROUP JOYT PROJECT MANAGER KAREN HATFIELD
ALL ALL LAB COORDINATOR KAREN HATFIELD

SAMPLE ID'S / PARAMETERS / UNITS	STORET / METHOD	11-215-00044 JOYT 1	11-215-00045 JOYT 2	11-215-00401 JOYT 3	11-215-00402 JOYT 4	11-215-00403 JOYT 5	11-215-00404 JOYT 6	11-215-00405 JOYT 7	11-215-00406 JOYT 8	11-215-00407 JOYT 9	11-215-00410 JOYT 10
DATE / TIME		05/12/97	05/12/97	05/13/97	05/13/97	05/13/97	05/13/97	05/13/97	05/13/97	05/13/97	05/15/97
MOISTURE %WET WT	70320 ASTM-G	84.3	54.6	71.5	37.4	21.4	27.8	28.7	22.1	43.9	34.6
ORGANIC CONTENT, TOTAL AT 440 C %-DRY	99016 ASTM-G	32.6	13.8	12.2	4.5	1.0	2.0	2.2	1.0	4.8	4.0
CARBON, TOC, ASOC/1.724 % DRY WT	80153 CALC	18.9	8.00	7.08	2.61	0.580	1.16	1.28	0.580	2.78	2.32

ESE BATCH : G82374
ANALYSIS : ASTM D2216

QC TYPE	: FDER/SW	REPORT DATE/TIME	: 05/30/97 09:18
ANALYST	: DEANN TRAN	ANALYSIS DATE/TIME	: 05/21/97 09:30
EXTRACTOR	: DEANN TRAN	EXTRACT DATE	: 05/20/97
DATA ENTRY	: BALANCE UPLOAD		

SAMPLE CODE	CLIENT ID	DATE ANALYZED	TIME ANALYZED
DA*JOYT*1	11-215-00044	05/20/97	04:07PM
DA*JOYT*2	11-215-00045	05/20/97	04:07PM
DA*JOYT*3	11-215-00401	05/20/97	04:07PM
DA*JOYT*4	11-215-00402	05/20/97	04:07PM
DA*JOYT*5	11-215-00403	05/20/97	04:08PM
DA*JOYT*6	11-215-00404	05/20/97	04:08PM
DA*JOYT*7	11-215-00405	05/20/97	04:08PM
DA*JOYT*8	11-215-00406	05/20/97	04:09PM
DA*JOYT*9	11-215-00407	05/20/97	04:09PM
DA*JOYT*10	11-215-00410	05/20/97	04:09PM
DA*JOYT*11	11-215-00501	05/20/97	04:10PM
DA*JOYT*12	11-215-00502	05/20/97	04:10PM
DA*JOYT*13	11-215-00503	05/20/97	04:10PM
DA*JOYT*14	11-215-00504	05/20/97	04:11PM
DA*JOYT*15	11-215-00505	05/20/97	04:11PM
DA*JOYT*16	11-215-00506	05/20/97	04:12PM
DA*JOYT*17	11-215-00605	05/20/97	04:12PM
DA*JOYT*18	11-215-00606	05/20/97	04:12PM
DA*JOYT*19	11-215-00607	05/20/97	04:13PM
DA*JOYT*20	11-215-00608	05/20/97	04:13PM
DA*JOYT*21	CONTROL	05/20/97	04:13PM
DA*LLZ*2	2707581	05/20/97	04:14PM

HOLDING TIMES CHECK

SAMPLE	ANALYTE	ANL DATE	EXT DATE	SMP DATE	H.T.	OVER

ALL HOLDING TIMES MET

Method Blank Sample Summary

DATE	SAMPLE	STORET	PARAMETER	UNITS	FOUND	DET LMT
05/20/97	MB*QC*1	70320*ASTM-G	MOISTURE	%WET W	0.002	0.5
05/20/97	MB*QC*2	70320*ASTM-G	MOISTURE	%WET W	0.006	0.5

Replicate Analysis Sample Summary

DATE	SAMPLE	STORET	PARAMETER	UNITS	REP #1	REP #2	RPD	RER	CRIT
05/20/97	RP*JOYT*10	70320*ASTM-G	MOISTURE	%WET W	34.6	33.5	3.2		23
05/20/97	RP*JOYT*15	70320*ASTM-G	MOISTURE	%WET W	20.5	20.0	2.5		23
05/20/97	RP*JOYT*21	70320*ASTM-G	MOISTURE	%WET W	20.0	20.7	3.4		23

ESE BATCH : G82535
ANALYSIS : ASTM D2974

QC TYPE	: FDER/SW	REPORT DATE/TIME	: 05/30/97 09:18
ANALYST	: DEANN TRAN	ANALYSIS DATE/TIME	: 05/20/97 16:00
EXTRACTOR	:	EXTRACT DATE	:
DATA ENTRY	: DEANN TRAN		

SAMPLE CODE	CLIENT ID	DATE ANALYZED	TIME ANALYZED
DA*JOYT*1	11-215-00044		
DA*JOYT*2	11-215-00045		
DA*JOYT*3	11-215-00401		
DA*JOYT*4	11-215-00402		
DA*JOYT*5	11-215-00403		
DA*JOYT*6	11-215-00404		
DA*JOYT*7	11-215-00405		
DA*JOYT*8	11-215-00406		
DA*JOYT*9	11-215-00407		
DA*JOYT*10	11-215-00410		
DA*JOYT*11	11-215-00501		
DA*JOYT*12	11-215-00502		
DA*JOYT*13	11-215-00503		
DA*JOYT*14	11-215-00504		
DA*JOYT*15	11-215-00505		
DA*JOYT*16	11-215-00506		
DA*JOYT*17	11-215-00605		
DA*JOYT*18	11-215-00606		
DA*JOYT*19	11-215-00607		
DA*JOYT*20	11-215-00608		
DA*JOYT*21	CONTROL		

HOLDING TIMES CHECK

SAMPLE	ANALYTE	ANL DATE	EXT DATE	SMP DATE	H.T.	OVER

ALL HOLDING TIMES MET

Method Blank Sample Summary

DATE	SAMPLE	STORET	PARAMETER	UNITS	FOUND	DET LMT
05/20/97	MB*QC*1	99016*ASTM-G	ORGANIC CONTENT,TOTAL AT 440	C%-DRY	0.03	0.5
05/20/97	MB*QC*2	99016*ASTM-G	ORGANIC CONTENT,TOTAL AT 440	C%-DRY	0.04	0.5

Replicate Analysis Sample Summary

DATE	SAMPLE	STORET	PARAMETER	UNITS	REP #1	REP #2	RPD	RER	CRIT
05/20/97	RP*JOYT*15	99016*ASTM-G	ORGANIC CONTENT,TOTAL AT 440	C%-DRY	8.1	7.9	2.5		20
05/20/97	RP*JOYT*16	99016*ASTM-G	ORGANIC CONTENT,TOTAL AT 440	C%-DRY	29.4	28.2	4.2		20

[redacted]

BSE BATCH : G82374
ANALYSIS : ASTM D2216

QC TYPE	: FDER/SW		REPORT DATE/TIME	: 05/30/97 09:18
ANALYST	: DEANN TRAN		ANALYSIS DATE/TIME	: 05/21/97 09:30
EXTRACTOR	: DEANN TRAN		EXTRACT DATE	: 05/20/97
DATA ENTRY	: BALANCE UPLOAD			

SAMPLE CODE	CLIENT ID	DATE ANALYZED	TIME ANALYZED
DA*JOYT*1	11-215-00044	05/20/97	04:07PM
DA*JOYT*2	11-215-00045	05/20/97	04:07PM
DA*JOYT*3	11-215-00401	05/20/97	04:07PM
DA*JOYT*4	11-215-00402	05/20/97	04:07PM
DA*JOYT*5	11-215-00403	05/20/97	04:08PM
DA*JOYT*6	11-215-00404	05/20/97	04:08PM
DA*JOYT*7	11-215-00405	05/20/97	04:08PM
DA*JOYT*8	11-215-00406	05/20/97	04:09PM
DA*JOYT*9	11-215-00407	05/20/97	04:09PM
DA*JOYT*10	11-215-00410	05/20/97	04:09PM
DA*JOYT*11	11-215-00501	05/20/97	04:10PM
DA*JOYT*12	11-215-00502	05/20/97	04:10PM
DA*JOYT*13	11-215-00503	05/20/97	04:10PM
DA*JOYT*14	11-215-00504	05/20/97	04:11PM
DA*JOYT*15	11-215-00505	05/20/97	04:11PM
DA*JOYT*16	11-215-00506	05/20/97	04:12PM
DA*JOYT*17	11-215-00605	05/20/97	04:12PM
DA*JOYT*18	11-215-00606	05/20/97	04:12PM
DA*JOYT*19	11-215-00607	05/20/97	04:13PM
DA*JOYT*20	11-215-00608	05/20/97	04:13PM
DA*JOYT*21	CONTROL	05/20/97	04:13PM
DA*LLZ*2	2707581	05/20/97	04:14PM

HOLDING TIMES CHECK

SAMPLE	ANALYTE	ANL DATE	EXT DATE	SMP DATE	H.T.	OVER

ALL HOLDING TIMES MET

Method Blank Sample Summary

DATE	SAMPLE	STORET	PARAMETER	UNITS	FOUND	DET LMT
05/20/97	MB*QC*1	70320*ASTM-G	MOISTURE	%WET W	0.002	0.5
05/20/97	MB*QC*2	70320*ASTM-G	MOISTURE	%WET W	0.006	0.5

Replicate Analysis Sample Summary

DATE	SAMPLE	STORET	PARAMETER	UNITS	REP #1	REP #2	RPD	RER	CRIT
05/20/97	RP*JOYT*10	70320*ASTM-G	MOISTURE	%WET W	34.6	33.5	3.2		23
05/20/97	RP*JOYT*15	70320*ASTM-G	MOISTURE	%WET W	20.5	20.0	2.5		23
05/20/97	RP*JOYT*21	70320*ASTM-G	MOISTURE	%WET W	20.0	20.7	3.4		23

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: Roy F Weston | SAMPLE ID: 608

PROJECT NUMBER: 3197225-0100 | TEST SPECIES: H. azteca

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	3.3	1	B	3.4	1	C	2.3	1	D	2.5
2		3.0	2		3.0	2		3.1	2		2.3
3		2.5	3		3.0	3		3.2	3		2.5
4		2.2	4		3.3	4		3.2	4		3.1
—		—	—		—	5		3.0	5		2.4
—		—	—		—	6		3.2	—		—
—		—	—		—	7		3.4	—		—
—		—	—		—	—		—	—		—
—		—	—		—	—		—	—		—
—		—	—		—	—		—	—		—
AVERAGE STD. DEV. RANGE		2.8 0.49 2.2-3.3	AVERAGE STD. DEV. RANGE		3.2 0.21 3.0-3.4	AVERAGE STD. DEV. RANGE		3.1 0.36 2.3-3.4	AVERAGE STD. DEV. RANGE		2.6 0.31 2.3-3.1
1	E	3.2	1	F	3.1	1	G	2.5	1	H	3.6
2		3.1	2		3.2	—		—	2		2.9
3		2.1	3		2.4	—		—	3		2.7
4		3.3	4		2.5	—		—	—		—
5		3.1	5		2.3	—		—	—		—
6		3.4	—		—	—		—	—		—
—		—	—		—	—		—	—		—
—		—	—		—	—		—	—		—
—		—	—		—	—		—	—		—
—		—	—		—	—		—	—		—
AVERAGE STD. DEV. RANGE		3.0 0.47 2.1-3.4	AVERAGE STD. DEV. RANGE		2.7 0.42 2.3-3.2	AVERAGE STD. DEV. RANGE		2.5 — —	AVERAGE STD. DEV. RANGE		3.1 0.47 2.7-3.6

Measuring Device: Micrometer | Calculator: RS-DAE

Data By: MD   Date: 6/4/97 | Reviewed By: Date:

[redacted]

Environmental Science & Engineering DATE 05/30/97 STATUS : PAGE 2
PROJECT NUMBER 1297323V L202 PROJECT NAME TOC FOR BIOASSAY
FIELD GROUP JOYT PROJECT MANAGER KAREN HATFIELD
ALL ALL LAB COORDINATOR KAREN HATFIELD

SAMPLE ID'S / PARAMETERS / UNITS	STORET / METHOD	11-215-00501 JOYT 11	11-215-00502 JOYT 12	11-215-00503 JOYT 13	11-215-00504 JOYT 14	11-215-00505 JOYT 15	11-215-00506 JOYT 16	11-215-00605 JOYT 17	11-215-00606 JOYT 18	11-215-00607 JOYT 19	11-215-00608 JOYT 20
DATE		05/15/97	05/15/97	05/15/97	05/15/97	05/15/97	05/15/97	05/14/97	05/14/97	05/14/97	05/14/97
TIME											
MOISTURE %WET WT	70320 ASTM-G	14.6	19.5	71.1	20.8	20.5	38.6	67.5	25.1	69.6	38.4
ORGANIC CONTENT,TOTAL AT 440 C %-DRY	99016 ASTM-G	6.8	3.8	17.1	4.7	8.1	29.4	10.2	1.9	9.8	5.7
CARBON,TOC,ASOC/1.724 % DRY WT	80153 CALC	3.94	2.20	9.92	2.73	4.70	17.1	5.92	1.10	5.68	3.31

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Reference Toxicant Control Chart
Reference Toxicant: Cadmium chloride
Species: Chironomus tentans

Run by:
Date:

Test No.	Lc50(mg/L)	Date
3	5.1	May 97
2	1.4	April96
1	0.35	July95

Average LC50(mg/ 2.3 mg/L

Two X Standard Deviation:
4.1

[redacted]

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
ESE QA Form No.: 097 SDS
Effective: APR 1993

REFERENCE TOXICANT TEST DATA: DAY 0 and 1

Client: MISC | **Project Number:** | **Species:** H. azteca

Nominal Concentration µg/L	Date: 5-19-97		Day: 0			
	Time: 1500		Analyst: QR			
	# Alive	Obs.	Temp.(C)	Sal.(ppt)	D.O.(mg/L)	pH
Control	10	n	20.5	—	8.2	7.9
8	10	n	—	—	—	—
16	10	n	—	—	—	—
32	10	n	—	—	—	—
64	10	n	—	—	—	—
128	10	n	—	—	—	—

Nominal Concentration µg/L	Date: 5-20-97		Day: 1			
	Time: 1000		Analyst: QR			
	# Alive	Obs.	Temp.(C)	Sal.(ppt)	D.O.(mg/L)	pH
Control	10	n	20.6	—	8.0	7.9
8	10	n	—	—	—	—
16	9	1 DEAD	—	—	—	—
32	8	2 DEAD	—	—	—	—
64	10	n	—	—	—	—
128	1	9 DEAD	—	—	—	—

[redacted]

AR301008

Avtex Fibers--Chironomus growth with reference
File: a:\avtex\ch6 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	reference	1.119	1.119		
2	45	0.276	0.276	8.341	*
3	405	0.884	0.884	2.327	
4	44	0.223	0.223	8.874	*
5	control	0.620	0.620	4.938	*
6	606	0.173	0.173	9.369	*
7	605	0.921	0.921	1.958	
8	403	0.979	0.979	1.386	

Dunnett table value = 2.42 (1 Tailed Value, P=0.05, df=40,7)

Avtex Fibers--Chironomus growth with reference
File: a:\avtex\ch6 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	reference	8			
2	45	8	0.244	21.8	0.84[illegible]
3	405	8	0.244	21.8	0.235
4	44	8	0.244	21.8	0.896
5	control	8	0.244	21.8	0.499
6	606	8	0.244	21.8	0.946
7	605	8	0.244	21.8	0.198
8	403	8	0.244	21.8	0.140

[redacted]

Avtex Fibers--Chironomus survival
File: a:\avtex\ch2   Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2   Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	8.250	8.250		
2	45	5.875	5.875	3.355	*
3	405	5.875	5.875	3.355	*
4	44	1.875	1.875	9.006	*

Dunnett table value = 2.17 (1 Tailed Value, P=0.05, df=24,3)

Avtex Fibers--Chironomus survival
File: a:\avtex\ch2   Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2   Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	8			
2	45	8	1.536	18.6	2.375
3	405	8	1.536	18.6	2.375
4	44	8	1.536	18.6	6.375

[redacted]

Avtex Fibers -- Chironomus tentans growth (weights)
File: a:\avtex\ch3 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	0.620	0.620		
2	404	1.729	1.729	-9.993	
3	407	1.803	1.803	-10.657	
4	402	1.526	1.526	-8.168	
5	607	1.374	1.374	-6.793	
6	410	1.119	1.119	-4.495	
7	606	0.173	0.173	4.033	*
8	605	1.065	1.065	-4.011	
9	403	0.979	0.979	-3.233	
10	608	1.151	1.151	-4.788	

Dunnett table value = 2.48 (1 Tailed Value, P=0.05, df=60,9)

Avtex Fibers -- Chironomus tentans growth (weights)
File: a:\avtex\ch3 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONT
1	control	8			
2	404	8	0.275	44.4	-1.109
3	407	8	0.275	44.4	-1.183
4	402	8	0.275	44.4	-0.906
5	607	8	0.275	44.4	-0.754
6	410	8	0.275	44.4	-0.499
7	606	8	0.275	44.4	0.448
8	605	8	0.275	44.4	-0.445
9	403	8	0.275	44.4	-0.359
10	608	8	0.275	44.4	-0.531

[redacted]

Avtex Fibers--Chironomus growth
File: a:\avtex\ch4 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	3	2.310	0.770	57.996
Within (Error)	28	0.372	0.013	
Total	31	2.682		

Critical F value = 2.95 (0.05,3,28)
Since F > Critical F REJECT Ho: All equal

[redacted]

AR301012

Avtex Fibers--Chironomus growth
File: a:\avtex\ch4 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	0.620	0.620		
2	45	0.276	0.276	5.967	*
3	405	0.884	0.884	-4.578	
4	44	0.223	0.223	6.900	*

Dunnett table value = 2.17 (1 Tailed Value, P=0.05, df=24,3)

Avtex Fibers--Chironomus growth
File: a:\avtex\ch4 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	8			
2	45	8	0.125	20.2	0.344
3	405	8	0.125	20.2	-0.264
4	44	8	0.125	20.2	0.398

[redacted]

Avtex Fibers--Chironomus growth with reference
File: a:\avtex\ch6   Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	7	8.058	1.151	28.210
Within (Error)	56	2.285	0.041	
Total	63	10.343		

Critical F value = 2.25 (0.05,7,40)
Since F > Critical F REJECT Ho: All equal

[redacted] AR301014

Avtex Fibers--Chironomus survival with reference
File: a:\avtex\ch5 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Reference	7.125	7.125		
2	45	5.875	5.875	1.757	
3	405	5.875	5.875	1.757	
4	44	1.875	1.875	7.381	*
5	607	5.750	5.750	1.933	
6	606	1.000	1.000	8.611	*

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

Avtex Fibers--Chironomus survival with referemce
File: a:\avtex\ch5 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Reference	8			
2	45	8	1.643	23.1	1.250
3	405	8	1.643	23.1	1.25[illegible]
4	44	8	1.643	23.1	5.25[illegible]
5	607	8	1.643	23.1	1.375
6	606	8	1.643	23.1	6.125

[redacted]

Avtex Fibers--Chironomus survival with reference
File: a:\avtex\ch5 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	250.667	50.133	24.772
Within (Error)	42	85.000	2.024	
Total	47	335.667		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho: All equal

[redacted]

Avtex Fibers -- Chironomus tentans growth (weights)
File: a:\avtex\ch3 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	9	17.809	1.979	40.182
Within (Error)	70	3.447	0.049	
Total	79	21.256		

Critical F value = 2.04 (0.05,9,60)
Since F > Critical F REJECT Ho: All equal

[redacted]

Appendix E: Chemical Analysis Raw Data

ESE BATCH : G82535

QC TYPE : FDER/SW
ANALYST : DEANH TRAN
EXTRACTOR :
DATA ENTRY : DEANH TRAN

REPORT DATE/TIME : 05/29/97 11:13
ANALYSIS DATE/TIME : 05/20/97 16:00
EXTRACT DATE :

STATUS :

METHOD BLANK CORRECTION METHOD : NONE

FIELD GRP	QC TYPE	PROJECT NUMBER	PROJECT NAME	LAB COORDINATOR
JOYT	FDER	1297323V L202	TOC FOR BIOASSAY	KAREN HATFIELD

Sample Specific Raw Data

SAMPLE CODE	EXTRACT DATE	ANALYSIS DATE	ANALYSIS TIME	SAMPLE VOL or WT (NA)	EXTRACT VOL or WT (NA)	INJECTION VOLUME (NA)	%MOISTURE
MB*QC*1							
MB*QC*2							
DA*JOYT*1							
DA*JOYT*2							
DA*JOYT*3							
DA*JOYT*4							
DA*JOYT*5							
DA*JOYT*6							
DA*JOYT*7							
DA*JOYT*8							
DA*JOYT*9							
DA*JOYT*10							
DA*JOYT*11							
DA*JOYT*12							
DA*JOYT*13							
DA*JOYT*14							
DA*JOYT*15							
DA*JOYT*16							
DA*JOYT*17							
DA*JOYT*18							
DA*JOYT*19							
DA*JOYT*20							
DA*JOYT*21							
RP*JOYT*15							
RP*JOYT*16							

[redacted]

Parameter Specific Raw Data

SAMPLE CODE	STORET METHOD	STAT	RESP (G)	UNC CONC (NA)	DIL	TYPE	CRV	RET TIME	SPIKE SOL CONC (NA)	SPIKE SAMP VOL (NA)	SPIKE VOLUME (NA)	DIL CODE	CALC'D TARGET (NA)
[illegible]QC*1	96497*I	OK	29.7987	29.7987									
	96498*I	OK	76.5819	76.5819									
	96499*I	OK	76.5673	76.5673									
	99016*ASTM-G	OK	.0312	0.03		FINAL							
HB*QC*2	96497*I	OK	32.3365	32.3365									
	96498*I	OK	81.2127	81.2127									
	96499*I	OK	81.1956	81.1956									
	99016*ASTM-G	OK	.0350	0.04		FINAL							
DA*JOYT*1	96497*I	NRK	45.6181	45.6181									
	96498*I	NRK	55.9552	55.9552									
	96499*I	NRK	52.5865	52.5865									
	99016*ASTM-G	OK	32.5884	32.6		FINAL							
DA*JOYT*2	96497*I	NRK	57.4053	57.4053									
	96498*I	NRK	78.3821	78.3821									
	96499*I	NRK	75.4955	75.4955									
	99016*ASTM-G	OK	13.7609	13.8		FINAL							
DA*JOYT*3	96497*I	NRK	48.7613	48.7613									
	96498*I	NRK	63.2636	63.2636									
	96499*I	NRK	61.5000	61.5000									
	99016*ASTM-G	OK	12.1608	12.2		FINAL							
DA*JOYT*4	96497*I	NRK	50.9463	50.9463									
	96498*I	NRK	81.3358	81.3358									
	96499*I	NRK	79.9683	79.9683									
	99016*ASTM-G	OK	4.4999	4.5		FINAL							
DA*JOYT*5	96497*I	NRK	50.8402	50.8402									
	96498*I	NRK	90.9162	90.9162									
	96499*I	NRK	90.5179	90.5179									
	99016*ASTM-G	OK	.9939	1.0		FINAL							
DA*JOYT*6	96497*I	NRK	57.7517	57.7517									
	96498*I	NRK	93.5928	93.5928									
	96499*I	NRK	92.8734	92.8734									
	99016*ASTM-G	OK	2.0072	2.0		FINAL							
DA*JOYT*7	96497*I	NRK	48.0277	48.0277									
	96498*I	NRK	83.8839	83.8839									
	96499*I	NRK	83.1096	83.1096									
	99016*ASTM-G	OK	2.1595	2.2		FINAL							
[illegible]JOYT*8	96497*I	NRK	50.3342	50.3342									
	96498*I	NRK	90.6382	90.6382									
	96499*I	NRK	90.2156	90.2156									
	99016*ASTM-G	OK	1.0485	1.0		FINAL							
DA*JOYT*9	96497*I	NRK	53.7911	53.7911									
	96498*I	NRK	81.9593	81.9593									
	96499*I	NRK	80.6046	80.6046									
	99016*ASTM-G	OK	4.8093	4.8		FINAL							
DA*JOYT*10	96497*I	NRK	59.4854	59.4854									
	96498*I	NRK	94.5458	94.5458									
	96499*I	NRK	93.1340	93.1340									
	99016*ASTM-G	OK	4.0268	4.0		FINAL							
DA*JOYT*11	96497*I	NRK	56.7288	56.7288									
	96498*I	NR	100.0403	100.0403									
	96499*I	NRK	97.1010	97.1010									
	99016*ASTM-G	OK	6.7864	6.8		FINAL							
DA*JOYT*12	96497*I	NRK	56.6366	56.6366									
	96498*I	NRK	97.1143	97.1143									
	96499*I	NRK	95.5580	95.5580									
	99016*ASTM-G	OK	3.8448	3.8		FINAL							
DA*JOYT*13	96497*I	NRK	53.4054	53.4054									
	96498*I	NRK	71.2661	71.2661									
	96499*I	NRK	68.2206	68.2206									
	99016*ASTM-G	OK	17.0514	17.1		FINAL							
DA*JOYT*14	96497*I	NRK	47.6229	47.6229									
	96498*I	NRK	91.4329	91.4329									
	96499*I	NRK	89.3582	89.3582									
	99016*ASTM-G	OK	4.7357	4.7		FINAL							
DA*JOYT*15	96497*I	NRK	54.3482	54.3482									
	96498*I	NRK	94.1708	94.1708									
	96499*I	NRK	90.9614	90.9614									
	99016*ASTM-G	OK	8.0592	8.1		FINAL							
[illegible]JOYT*16	96497*I	NRK	56.2008	56.2008									
	96498*I	NRK	86.3138	86.3138									
	96499*I	NRK	77.4658	77.4658									
	99016*ASTM-G	OK	29.3827	29.4		FINAL							
DA*JOYT*17	96497*I	NRK	55.5643	55.5643									
	96498*I	NRK	73.1848	73.1848									

[redacted]

	96499*I	NRK"71.3873"		71.3873	
	99016*ASTM-G	OK	10.2012	10.2	FINAL
DA*JOYT*18	96497*I	NRK"60.0213"		60.0213	
	96498*I	NRK"96.6353"		96.6353	
	96499*I	NRK"95.9487"		95.9487	
	99016*ASTM-G	OK	1.8752	1.9	FINAL
DA*JOYT*19	96497*I	NRK"56.1821"		56.1821	
	96498*I	NRK"71.1146"		71.1146	
	96499*I	NRK"69.6457"		69.6457	
	99016*ASTM-G	OK	9.8369	9.8	FINAL
DA*JOYT*20	96497*I	NRK"56.2516"		56.2516	
	96498*I	NRK"93.7879"		93.7879	
	96499*I	NRK"91.6658"		91.6658	
	99016*ASTM-G	OK	5.6535	5.7	FINAL
DA*JOYT*21	96497*I	NRK"49.3263"		49.3263	
	96498*I	NRK"90.4071"		90.4071	
	96499*I	NRK"90.3875"		90.3875	
	99016*ASTM-G	OK	.0477	0.05	FINAL
RP*JOYT*15	96497*I	OK	54.2095	54.2095	
	96498*I	OK	94.0655	94.0655	
	96499*I	OK	90.9336	90.9336	
	99016*ASTM-G	OK	7.8580	7.9	FINAL
RP*JOYT*16	96497*I	OK	57.2831	57.2831	
	96498*I	OK	86.3230	86.3230	
	96499*I	OK	78.1212	78.1212	
	99016*ASTM-G	OK	28.2432	28.2	FINAL

[redacted]

(TOC440)

Notebook # 92-1

4:00pm

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

Organic Content, Total at 440 °C % Dry
ASTM D2974-87

Analyst: Yan Date: 5-20-97 Storet: 99016 x ASTM-G Batch: G 82535,

CRUCIBLE #	SAMPLE #	DISH WT	SAMPLE WT	DISH AND SAMPLE WT	105 °C WT 5-20-97	440 °C WT 5-21-97	% ORGANIC CONTENT
# 1	mB1	29.7987			76.5819	76.5673	
2	mB2	32.3365			81.2127	81.1956	
3	JOYT* 1	45.6181			55.9552	52.5865	
4	2	57.4053			78.3821	75.4955	
5	3	48.1613			63.2636	61.5000	
6	4	50.9463			81.3358	79.9683	
7	5	50.8402			90.9162	90.5179	
8	6	57.7517			93.5928	92.8734	
9	7	48.0277			83.8839	83.1096	
10	8	50.3342			90.6382	90.2156	
11	9	53.7911			81.9593	80.6046	
12	10	59.4854			94.5458	93.1340	
13	11	56.7288			100.0403	97.1010	
14	12	56.6366			97.1143	95.5580	
15	13	53.4054			71.2661	68.2206	
16	14	47.6229			91.4329	89.3582	
17	15	54.3482			94.1108	90.9614	

(TOC440 03/92)

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Cont. fr. p. 101

Notebook # 92-1
ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
Organic Content, Total at 440 °C % Dry
ASTM D2974-87

Analyst:__________ Date:__________ Storet:__________ Batch:__________

CRUCIBLE #	SAMPLE #	DISH WT A	SAMPLE WT	DISH AND SAMPLE WT	105 °C WT. B	440 °C WT C	% ORGANIC CONTENT
18	JOYT *16	56.2008			86.3138	77.4658	
19	17	55.5643			73.1848	71.3873	
20	18	60.0213			96.6353	95.9487	
21	19	56.1821			71.1146	69.6457	
22	20	56.2516			93.7879	91.6658	
23	21	49.3263			90.4071	90.3875	
24	15 RP	54.2095.			94.0655	90.9336	
25	16 RP	57.2831			86.3230	78.1212	

[redacted]

JOYT *16* RP $= 100 - \left[\frac{(C-A)\,100}{(B-A)}\right] = 100\left[\frac{(78.1212 - 57.2831)\,100}{(86.323 - 57.2831)}\right] = 28.24$ % DID

5-29-97

OC440 03/92

```
Avtex Fibers--Chironomus survival
File: a:\avtex\ch2          Transform: NO TRANSFORMATION
```

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	3	167.844	55.948	27.912
Within (Error)	28	56.125	2.004	
Total	31	223.969		

Critical F value = 2.95 (0.05,3,28)
Since F > Critical F REJECT Ho: All equal

[redacted]

Avtex Fibers -- Chironomus tentans survival
File: a:\avtex\ch1   Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2   Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	8.250	8.250		
2	404	8.625	8.625	-0.555	
3	407	8.250	8.250	0.000	
4	402	8.125	8.125	0.185	
5	607	5.750	5.750	3.703	*
6	410	7.125	7.125	1.666	
7	606	1.000	1.000	10.739	*
8	605	8.000	8.000	0.370	
9	403	7.750	7.750	0.741	
10	608	8.500	8.500	-0.370	

Dunnett table value = 2.48   (1 Tailed Value, P=0.05, df=60,9)

Avtex Fibers -- Chironomus tentans survival
File: a:\avtex\ch1   Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2   Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONT
1	control	8			
2	404	8	1.674	20.3	-0.375
3	407	8	1.674	20.3	0.000
4	402	8	1.674	20.3	0.125
5	607	8	1.674	20.3	2.500
6	410	8	1.674	20.3	1.125
7	606	8	1.674	20.3	7.250
8	605	8	1.674	20.3	0.250
9	403	8	1.674	20.3	0.500
10	608	8	1.674	20.3	-0.250

[redacted]

vtex Fibers -- Chironomus tentans survival
ile: a:\avtex\ch1 Transform: NO TRANSFORMATION

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	9	385.863	42.874	23.515
ithin (Error)	70	127.625	1.823	
otal	79	513.488		

Critical F value = 2.04 (0.05,9,60)
Since F > Critical F REJECT Ho: All equal

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017A
EFFECTIVE:
PROJECT NO:

SUBJECT: TEST ORGANISM SURVIVAL AND WEIGHTS

SPONSOR: Roy F Weston | SPECIES: C. tentans

Sample ID	Boat	Rep	No. Alive	Tare Wt (g)	Gross Wt (g)	Net Wt (mg)	Average
405	193	A	8	0.9264	0.9319	5.5/0.69	0.88 mg/org
	194	B	4	0.9219	0.9255	3.6/0.90	
	195	C	5	0.9263	0.9315	5.2/1.04	
	196	D	4	0.9340	0.9370	3.0/0.75	
	197	E	6	0.9393	0.9466	7.1/1.18	
	198	F	8	0.9405	0.9459	5.4/0.68	
	199	G	7	0.9369	0.9438	6.9/0.99	
	200	H	5	0.9397	0.9439	4.2/0.84	
44	201	A	3	0.9376	0.9381	0.50/0.17	0.22 mg/org
	202	B	2	0.9317	0.9323	0.60/0.30	
	203	C	1	0.9356	0.9358	0.20/0.20	
	204	D	3	0.9338	0.9344	0.60/0.20	
	205	E	5	0.9344	0.9352	0.80/0.16	
	206	F	2	0.9356	0.9361	0.50/0.25	
	207	G	1	0.9246	0.9248	0.20/0.20	
	208	H	1	0.9337	0.9340	0.30/0.30	
		A					
		B					
		C					
		D					
		E					
		F					
		G					
		H					

Balance Used: SP180 Calculator Used: RS-DAE By: MO Date: 6/2/97

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017A
EFFECTIVE:
PROJECT NO: 3197225

SUBJECT: TEST ORGANISM SURVIVAL AND WEIGHTS

SPONSOR: ROY F WESTON | SPECIES: C. tentans

Sample ID	Boat	Rep	No. Alive	Tare Wt (g)	Gross Wt (g)	Net Wt (mg)	Average
608	169	A	7	0.9313	0.9393	8.0 / 1.14	1.15 mg/org
	170	B	9	0.9408	0.9521	11.3 / 1.26	
	171	C	9	0.9459	0.9557	9.8 / 1.09	
	172	D	9	0.9482	0.9557	7.5 / 0.83	
	173	E	8	0.9479	0.9574	9.5 / 1.19	
	174	F	9	0.9447	0.9570	12.3 / 1.37	
	175	G	7	0.9188	0.9261	7.3 / 1.04	
	176	H	10	0.9182	0.9311	12.9 / 1.29	
403	177	A	6	0.9425	0.9485	6.0 / 1.00	0.98 mg/org.
	178	B	10	0.9363	0.9465	10.2 / 1.02	
	179	C	8	0.9396	0.9490	9.4 / 1.18	
	180	D	8	0.9313	0.9397	8.4 / 1.05	
	181	E	9	0.9390	0.9487	9.7 / 1.08	
	182	F	8	0.9419	0.9483	6.4 / 0.80	
	183	G	8	0.9429	0.9496	6.7 / 0.84	
	184	H	5	0.9411	0.9454	4.3 / 0.86	
45	185	A	4	0.9268	0.9275	0.7 / 0.18	0.28 mg/org
	186	B	6	0.9244	0.9262	1.8 / 0.30	
	187	C	6	0.9276	0.9285	0.9 / 0.15	
	188	D	7	0.9339	0.9360	2.1 / 0.30	
	189	E	4	0.9257	0.9270	1.3 / 0.33	
	190	F	6	0.9122	0.9139	1.7 / 0.28	
	191	G	8	0.9102	0.9130	2.8 / 0.35	
	192	H	6	0.9058	0.9077	1.9 / 0.32	

Balance Used: SPV80 Calculator Used: RS-DAE By: MO Date: 6/2/97

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017A
EFFECTIVE:
PROJECT NO: 3197225

SUBJECT: TEST ORGANISM SURVIVAL AND WEIGHTS

SPONSOR: Roy F Weston SPECIES: C. tentans

Sample ID	Boat	Rep	No. Alive	Tare Wt (g)	Gross Wt (g)	Net Wt (mg)	Average
410	145	A	6	0.9196	0.9296	10.0/1.67	1.12 mg/org
	146	B	8	0.9177	0.9256	7.9/0.99	
	147	C	8	0.9179	0.9256	7.7/0.96	
	148	D	4	0.9204	0.9254	5.0/1.25	
	149	E	8	0.9174	0.9243	6.9/0.86	
	150	F	8	0.9117	0.9185	6.8/0.85	
	151	G	7	0.9138	0.9237	9.9/1.41	
	152	H	8	0.9143	0.9220	7.7/0.96	
606	153	A	1	0.9162	0.9167	0.50/0.50	0.35 mg/org
	154	B	1	0.9205	0.9208	0.30/0.30	
	155	C	0	0.9215	—	—	
	156	D	2	0.9197	0.9202	~~0.25~~ 0.50/0.25	
	157	E	0	0.9284	—	mo 6/2/97 (ws) —	
	158	F	4	0.9278	0.9291	1.30/0.33	
	159	G	0	0.9284	—	—	
	160	H	0	0.9231	—	—	
605	161	A	9	0.9387	0.9463	7.6/0.84	1.07 mg/org
	162	B	7	0.9213	0.9304	9.1/1.30	
	163	C	10	0.9143	0.9232	8.9/0.89	
	164	D	6	0.9047	0.9106	5.9/0.98	
	165	E	9	0.9094	0.9206	11.2/1.24	
	166	F	8	0.9245	0.9330	8.5/1.06	
	167	G	10	0.9284	0.9377	9.3/0.93	
	168	H	5	0.9241	0.9305	6.4/1.28	

Balance Used: SP180 Calculator Used: RS-DAE By: mo Date: 6/2/97

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Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017A
EFFECTIVE:
PROJECT NO:

SUBJECT: TEST ORGANISM SURVIVAL AND WEIGHTS

SPONSOR: Roy F Weston | SPECIES: C. tentans

Sample ID	Boat	Rep	No. Alive	Tare Wt (g)	Gross Wt (g)	Net Wt (mg)	Average
402	121	A	7	0.9320	0.9446	12.6 / 1.80	1.53 mg/org
	122	B	8	0.9328	0.9444	11.6 / 1.45	
	123	C	10	0.9383	0.9515	13.2 / 1.32	
	124	D	8	0.9434	0.9556	12.2 / 1.53	
	125	E	9	0.9353	0.9474	12.1 / 1.34	
	126	F	7	0.9273	0.9394	12.1 / 1.73	
	127	G	8	0.9274	0.9370	9.6 / 1.20	
	128	H	8	0.9399	0.9546	14.7 / 1.84	
407	129	A	7	0.9373	0.9545	17.2 / 2.46	1.80 mg/org
	130	B	7	0.9104	0.9240	13.6 / 1.94	
	131	C	9	0.9157	0.9315	15.8 / 1.76	
	132	D	6	0.9152	0.9246	9.4 / 1.57	
	133	E	10	0.9179	0.9359	17.5 / 1.75	
	134	F	7	0.9194	0.9315	12.1 / 1.73	
	135	G	10	0.9242	0.9385	14.3 / 1.43	
	136	H	10	0.9256	0.9434	17.8 / 1.78	
607	137	A	5	0.9179	0.9260	8.1 / 1.62	1.36 mg/org
	138	B	8	0.9161	0.9246	8.5 / 1.06	
	139	C	6	0.9179	0.9263	8.4 / 1.40	
	140	D	5	0.9194	0.9271	7.7 / 1.54	
	141	E	6	0.9167	0.9233	6.6 / 1.10	
	142	F	5	0.9180	0.9246	6.6 / 1.32	
	143	G	5	0.9242	0.9317	7.5 / 1.50	
	144	H	6	0.9243	0.9324	8.1 / 1.35	

Balance Used: SP180 Calculator Used: RS-PAE By: MO Date: 6/2/97

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017A
EFFECTIVE:
PROJECT NO: 3197225

SUBJECT: TEST ORGANISM SURVIVAL AND WEIGHTS

SPONSOR: Roy F. Weston | SPECIES: C. tentans

Sample ID	Boat	Rep	No. Alive	Tare Wt (g)	Gross Wt (g)	Net Wt (mg)	Average
CONTROL	97	A					
	98	B					
	99	C					
	100	D					
	101	E					
	102	F					
	103	G					
	104	H					
Control	105	A	9	0.9227	0.9302	7.5/0.83	0.62 mg/org
	106	B	9	0.9388	0.9444	5.6/0.62	
	107	C	7	0.9277	0.9315	3.8/0.54	
	108	D	7	0.9212	0.9253	4.1/0.59	
	109	E	8	0.9202	0.9263	6.1/0.76	
	110	F	8	0.9187	0.9231	4.4/0.55	
	111	G	8	0.9154	0.9199	4.5/0.56	
	112	H	10	0.9326	0.9377	5.1/0.51	
404	113	A	7	0.9279	0.9409	13.0/1.86	1.73 mg/org
	114	B	9	0.9260	0.9392	13.2/1.47	
	115	C	10	0.9288	0.9429	14.1/1.41	
	116	D	8	0.9298	0.9458	16.0/2.00	
	117	E	9	0.9273	0.9444	17.1/1.90	
	118	F	8	0.9327	0.9496	16.9/2.11	
	119	G	10	0.9349	0.9479	13.0/1.30	
	*120	H	8	0.9354	0.9496	14.2/1.78	

Balance Used: SP180 Calculator Used: RS-DAE By: MO Date: 6/02/97

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F WESTON
SAMPLE ID: 44
PROJECT NUMBER: 3197225-0100
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	23.0	~~140~~/160	<0.1	8.0	6.0	260	—	CR 1400
5/22/97 1	B	22.7	—	—	8.2	8.2	—	TET	CR 1000
5/23/97 2	C	22.3	—	—	8.2 ~~7.8~~	8.0	—	—	CR 1130
5/24/97 3	D	22.5	—	—	8.2	8.1	—	—	MO 1330
5/25/97 4	E	22.5	—	—	8.3	8.2	—	—	JN 1230
5/26/97 5	F	22.7	—	—	8.2	8.0	—	TET	MO 1315
5/27/97 6	G	22.8	—	—	8.3	8.1	—	—	MO 1145
5/28/97 7	H	22.3	—	—	8.3	7.9	—	—	MO 1030
5/29/97 8	A	22.3	—	—	8.3	8.0	—	TET	MO 0845
5/30/97 9	B	22.8	—	—	8.3	7.7	—	—	MO 0915
5/31/97 10	C	23.2	145/150	<0.1	8.3	7.9	285	—	MO 0800

OBSERV DATE-DAY	REPLICATE A	B	C	D	E	F	G	H	Initial
5/21/97 0	∩	∩	∩	∩	∩	∩	∩	∩	CR 1600
5/22/97 1	4 EMR	3 EMR	2 EMR	4 EMR	∩	∩	∩	1 EMR	CR 1030
5/23/97 2	4 EMR	1 EMR	1 DEAD 2 EMR	1 EMR	2 EMR	2 EMR	4 EMR	∩	CR 1200
5/24/97 3	3 EMR	2 EMR	2 EMR	2 EMR	3 EMR	1 EMR	2 EMR	2 EMR	MO 1345
5/25/97 4	4 EMR	2 EMR	2 EMR	3 EMR	3 EMR	4 EMR	2 EMR	2 EMR	JN 1230
5/26/97 5	3 EMR	3 EMR	1 EMR	3 EMR	2 EMR	2 EMR	3 EMR	1 EMR	MO 1315
5/27/97 6	1 EMR	1 EMR 1 AS	1 EMR	1 EMR	2 EMR	1 EMR	1 EMR	N	MO 1145
5/28/97 7	2 DEAD 2 EMR	2 EMR	1 DEAD 1 EMR	N	1 DEAD	N	2 EMR	2 EMR	MO 1100
5/29/97 8	1 EMR	N	N	N	1 EMR	N	1 EMR	2 EMR	MO 0900
5/30/97 9	N	1 EMR	N	N	1 EMR	1 EMR	1 DEAD	N	MO 0930
5/31/97 10	3 Dead, 5 NF	2A, 3D 5NF	1A, 2D 1 5NF	3A, 1D 6NF	5A, 2D 1 2NF	2A, 3D 5NF	1A, 3D, 5NF	1A, 3D 6NF	MO 1245

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F WESTON
SAMPLE ID: 405
PROJECT NUMBER:
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	22.9	135/160	<0.1	7.9	7.0	360	—	CR 1400
5/22/97 1	B	22.7	—	—	7.9	8.0	—	TET	CR 1000
5/23/97 2	C	22.3	—	—	7.9	8.1	—	—	MO 1130
5/24/97 3	D	22.6	—	—	8.0	8.2	—	—	MO 1330
5/25/97 4	E	22.5	—	—	8.0	8.2	—	—	JY 1230
5/26/97 5	F	22.6	—	—	8.0	8.2	—	TET	MO 1315
5/27/97 6	G	22.7	—	—	8.1	8.0	—	—	MO 1115
5/28/97 7	H	22.5	—	—	8.1	8.0	—	—	MO 1030
5/29/97 8	A	22.3	—	—	8.1	7.9	—	TET	MO 0845
5/30/97 9	B	22.8	—	—	8.1	7.7	—	—	MO 0915
5/31/97 10	C	23.3	150/165	<0.1	8.2	7.6	385	—	MO 0800

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5/21/97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1500
5/22/97 1									CR 1000
5/23/97 2									MO 1200
5/24/97 3	N	N	N	N	N	N	N	N	MO 1345
5/25/97 4	N	N	N	N	N	N	N	N	JY 1225
5/26/97 5	N	N	N	N	N	N	N	N	MO 1316
5/27/97 6	N	N	N	N	N	N	N	N	MO 1141
5/28/97 7	N	N	N	N	N	N	N	N	MO 1100
5/29/97 8	N	N	N	N	N	N	N	N	MO 090
5/30/97 9	N	N	N	N	N	N	N	N	MO 093
5/31/97 10	8A, 2NF	4A, 6NF	5A, 5NF	~~8A~~ 9A, 6NF	6A, 4NF	8A, 2NF	7A, 3NF	5A, 5NF	MO 1230

Comments:
mo 5/31/97 (WP)

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F WESTON
SAMPLE ID: 45

PROJECT NUMBER: 3197225-0100
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (μmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	22.7	150/165	0.10	7.8	7.3	300	—	CR 1400
5/22/97 1	B	22.6	—	—	7.8	8.3	—	TET	CR 1000
5/23/97 2	C	22.3	—	—	7.9	8.0	—	—	MO 1130
5/24/97 3	D	22.5	—	—	8.0	8.3	—	—	MO 1330
5/25/97 4	E	22.6	—	—	8.0	8.4	—	—	JY 1230
5/26/97 5	F	22.6	—	—	8.0	8.2	—	TET	MO 1315
5/27/97 6	G	22.7	—	—	8.1	8.1	—	—	MO 1115
5/28/97 7	H	22.5	—	—	8.0	7.8	—	—	MO 1030
5/29/97 8	A	22.3	—	—	8.1	7.9	—	TET	MO 0845
5/30/97 9	B	22.9	—	—	8.1	7.5	—	—	MO 0915
5/31/97 10	C	23.2	155/185	0.50	8.1	7.8	335	—	MO 0800

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5/21/97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1500
5/22/97 1	n	n	n	n	n	n	n	n	CR 1030
5/23/97 2	n	n	n	n	n	n	n	n	MO 1200
5/24/97 3	N	N	N	N	N	N	N	N	MO 1345
5/25/97 4	N	N	N	N	N	N	N	N	JY 1225
5/26/97 5	N	N	N	N	N	N	N	N	MO 1315
5/27/97 6	N	N	N	N	N	N	N	N	MO 1145
5/28/97 7	N	N	N	N	N	N	N	N	MO 1100
5/29/97 8	N	N	N	N	N	N	N	N	MO 0920
5/30/97 9	N	N	N	N	N	N	N	N	MO 0930
5/31/97 10	4A, 1D, 5NF	6A, 1D, 5NF	6A, 4NF	7A, 1D, 2NF	4A, 2D, 4NF	6A, 4NF	8A, 2NF	6A, 4NF	MO 1200

Comments: Limited growth

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F. WESTON
SAMPLE ID: 403

PROJECT NUMBER: 3197225-0100
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	22.5	120/140	<0.1	7.8	6.9	330	—	CR 1400
5/22/97 1	B	22.5	—	—	8.1	8.5	—	TEG	CR 1000
5/23/97 2	C	22.2	—	—	8.1	8.1	—	—	MO 1130
5/24/97 3	D	22.5	—	—	8.0	8.2	—	—	MO 1330
5/25/97 4	E	22.5	—	—	8.0	8.3	—	—	JY 1230
5/26/97 5	F	22.6	—	—	8.1	8.4	—	TEG	MO 1315
5/27/97 6	G	22.7	—	—	8.2	8.2	—	—	MO 1105
5/28/97 7	H	22.4	—	—	8.2	7.7	—	—	MO 1030
5/29/97 8	A	22.3	—	—	8.1	7.9		TEG	MO 0845
5/30/97 9	B	22.9	—	—	8.1	8.0	—	—	MO 0915
5/31/97 10	C	23.2	140/135	<0.1	8.1	7.6	380	—	MO 0800

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5/21/97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1500
5/22/97 1	∩	∩	∩	∩	∩	∩	∩	∩	CR 1030
5/23/97 2	∩	∩	∩	∩	∩	∩	∩	∩	MO 1200
5/24/97 3	N	N	N	N	N	N	N	N	MO 1345
5/25/97 4	N	N	N	N	N	N	N	N	JY 1225
5/26/97 5	N	N	N	N	N	N	N	N	MO 1315
5/27/97 6	N	N	N	N	N	N	N	N	MO 114[illegible]
5/28/97 7	N	N	N	N	N	N	N	N	MO 110[illegible]
5/29/97 8	N	N	N	N	N	N	N	N	MO 090[illegible]
5/30/97 9	N	N	N	N	N	N	N	N	MO 093[illegible]
5/31/97 10	6A, 4NF	10A	8A, 2NF	8A, 2NF	9A, 1NF	8A, 2NF	8A, 2NF	5A, 5NF	MO 1145

Comments:

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT F[illegible]D
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F WESTON
SAMPLE ID: 608
PROJECT NUMBER: 3197225-0106
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	22.5	110/250	<0.1	9.1	6.0	800	—	CR 1400
5/22/97 1	B	22.6	—	—	9.0	8.2	—	TET	CR 1000
5/23/97 2	C	22.2	—	—	9.1	8.1	—	—	MO 1130
5/24/97 3	D	22.5	—	—	9.0	8.2	—	—	MO 1330
5/25/97 4	E	22.6	—	—	8.9	8.2	—	—	JY 1230
5/26/97 5	F	22.7	—	—	8.8	8.1	—	TET	MO 1315
5/27/97 6	G	22.6	—	—	8.7	8.0	—	—	MO 1115
5/28/97 7	H	22.4	—	—	8.8	7.6	—	—	MO 1030
5/29/97 8	A	22.3	—	—	8.8	7.7	—	TET	MO 0845
5/30/97 9	B	22.9	—	—	8.7	7.6	—	—	MO 0915
5/31/97 10	C	23.2	125/285	<0.1	8.8	7.5	850	—	MO 0800

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5/21/97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1500
5/22/97 1	"	"	"	"	"	"	"	"	CR 1030
5/23/97 2	"	"	"	"	"	"	"	"	MO 1200
5/24/97 3	N	N	N	N	N	N	N	N	MO 1345
5/25/97 4	N	N	N	N	N	N	N	N	JY 1225
5/26/97 5	N	N	N	N	N	N	N	N	MO 1315
5/27/97 6	N	N	N	N	N	N	N	N	MO 1045
5/28/97 7	N	N	N	N	N	N	N	N	MO 1100
5/29/97 8	N	N	N	N	N	N	N	N	MO 0900
5/30/97 9	N	N	N	N	N	N	N	N	MO 0930
5/31/97 10	7A, 3NF	9A, 1NF	9A, 1NF	9A, 1NF	8A, 2NF	9A, 1NF	7A, 3NF	10A	MO 1120

Comments:

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: Roy F. Weston
SAMPLE ID: 605
PROJECT NUMBER: 3197225-0100
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	22.4	120/140	<0.1	8.1	7.0	280		CR 1400
5/22/97 1	B	22.5	—	—	8.5	8.2	—	TET	CR 1000
5/23/97 2	C	22.3	—	—	8.5	8.1	—	—	CR 1130
5/24/97 3	D	22.6	—	—	8.4	8.2	—	—	MO 1330
5/25/97 4	E	22.6	—	—	8.4	8.0	—	—	JY 1230
5/26/97 5	F	22.6	—	—	8.4	7.8	—	TET	MO 1315
5/27/97 6	G	22.5	—	—	8.3	7.9	—	—	MO 1115
5/28/97 7	H	22.5	—	—	8.3	7.7	—	—	MO 1030
5/29/97 8	A	22.4	—	—	8.2	7.8	—	TET	MO 0845
5/30/97 9	B	23.0	—	—	8.3	7.8	—	—	MO 0918
5/31/97 10	C	23.2	140/155	<0.1	8.3	8.0	310	—	MO 0800

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5/21/97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1520
5/22/97 1	N	N	N	1 EMR	N	1 EMR	N	N	CR 1030
5/23/97 2	N	N	N	N	N	N	N	N	CR 1200
5/24/97 3	N	N	N	N	N	N	N	N	MO 1345
5/25/97 4	N	N	N	N	N	N	N	N	JY 1225
5/26/97 5	N	N	N	N	N	N	N	N	MO 1315
5/27/97 6	N	N	N	N	N	N	N	N	MO 1145
5/28/97 7	N	N	N	N	N	N	N	N	MO 1100
5/29/97 8	N	N	N	N	N	N	N	N	MO 0950
5/30/97 9	N	N	N	N	N	N	N	N	MO 0930
5/31/97 10	9A, 1NF	7A, 3NF	10A	6A, 4NF	9A, 1NF	8A, 2NF	10A	5A, 5NF	MO 1115

Comments:

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FED
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: Roy F. Weston
SAMPLE ID: 606
PROJECT NUMBER: 3197225-0100
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	22.3	120/160	2.0	8.2	7.8	300	—	CR 1400
5/22/97 1	B	22.5	—	—	8.0	8.1	—	TET	CR 1000
5/23/97 2	C	22.3	—	—	8.1	7.2	—	—	CR 1130
5/24/97 3	D	22.5	—	—	8.1	7.6	—	—	MO 1330
5/25/97 4	E	22.6	—	—	8.3	7.6	—	—	JW 1230
5/26/97 5	F	22.6	—	—	8.2	7.7	—	TET	MO 1215
5/27/97 6	G	22.7	—	—	8.2	8.0	—	—	MO 1115
5/28/97 7	H	22.4	—	—	8.1	7.3	—	—	MO 1030
5/29/97 8	A	22.5	—	—	8.2	7.6	—	TET	MO 0845
5/30/97 9	B	22.9	—	—	8.2	7.5	—	—	MO 0915
5/31/97 10	C	23.3	125/175	2.0	8.2	7.7	340	—	MO 0800

OBSERV DATE-DAY	REPLICATE A	B	C	D	E	F	G	H	Initial
5/21/97 0	10 L	10 L	10 L	10 L	10 L	10 L	10 L	10 L	CR 1500
5/22/97 1	"	"	"	"	"	"	"	"	CR 1030
5/23/97 2	"	"	"	"	1 EMR	"	"	1 EMR	CR 1200
5/24/97 3	N	N	1 EMR	N	N	N	N	1 EMR	MO 1345
5/25/97 4	4 EMR	2 EMR	6 EMR	2 EMR	4 EMR	2 EMR	4 EMR	4 EMR	JW 1225
5/26/97 5	N	1 EMR	1 EMR	1 EMR	2 EMR	N	2 EMR	N	MO 1315
5/27/97 6	N	N	1 EMR	1 EMR	N	1 EMR	1 EMR	N	MO 1145
5/28/97 7	N	N	N	N	N	2 EMR	N	N	MO 1100
5/29/97 8	N	N	N	N	N	N	1 EMR	N	MO 0900
5/30/97 9	N	N	N	N	N	N	N	1 EMR	MO 0930
5/31/97 10	1A, 9NF	1A, 9NF	0A, 10NF	2A, 8NF	0A, 10NF	4A, 2D, 4NF	0A, 10NF	0A, 1D, 9NF	MO 1045

Comments: Petroleum odor; surviving organisms are small + lethargic. MO 5/31/97

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: Roy F Weston
SAMPLE ID: A10

PROJECT NUMBER: 3197225-010C
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	22.3	160/150	<0.1	7.9	6.0	280	—	CR 1400
5/22/97 1	B	22.5	—	—	7.8	8.3	—	TET	CR 1000
5/23/97 2	C	22.3	—	—	8.0	7.9	—	—	MO 1130
5/24/97 3	D	22.6	—	—	8.1	8.0	—	—	MO 1330
5/25/97 4	E	22.5	—	—	8.0	7.8	—	—	JN 1230
5/26/97 5	F	22.6	—	—	8.1	8.0	—	TET	MO 1315
5/27/97 6	G	22.8	—	—	8.0	7.9	—	—	MO 1115
5/28/97 7	H	22.5	—	—	8.1	7.9	—	—	MO 1030
5/29/97 8	A	22.5	—	—	8.2	7.7	—	TET	MO 0845
5/30/97 9	B	22.9	—	—	8.2	7.8	—	—	MO 0915
5/31/97 10	C	23.2	165/160	<0.1	8.2	8.0	290	—	MO 0800

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5/21/97 0	10L	10L	10L	10L	10L	10L	10L	10L	CR 1500
5/22/97 1	1EMR	1EMR	N	N	N	N	N	N	CR 1030
5/23/97 2	N	N	N	N	N	N	N	N	MO 1200
5/24/97 3	N	N	N	N	N	N	N	N	MO 1345
5/25/97 4	N	N	N	N	N	N	N	N	JN 1220
5/26/97 5	N	N	N	N	N	N	N	N	MO 1315
5/27/97 6	N	N	N	N	N	N	N	N	MO 1145
5/28/97 7	N	N	N	N	N	N	N	N	MO 1100
5/29/97 8	N	N	N	N	N	N	N	N	MO 0900
5/30/97 9	N	N	N	N	N	N	N	N	MO 0930
5/31/97 10	6A, 4NF	8A, 2NF	8A, 2NF	4A, 6NF	8A, 2NF	8A, 2NF	7A, 3NF	8A, 2NF	MO 1030

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT F[illegible]D
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: Roy F Weston
SAMPLE ID: 607

PROJECT NUMBER: 3197225-0100
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (μmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	22.5	160/160	0.50	7.8	8.0	302	—	MO 1400
5/22/97 1	B	22.5	—	—	8.0	8.4	—	TET	CR 1000
5/23/97 2	C	22.3	—	—	8.1	7.9	—	—	MO 1130
5/24/97 3	D	22.6	—	—	8.0	8.1	—	—	MO 1330
5/25/97 4	E	22.6	—	—	8.0	8.0	—	—	JV 1230
5/26/97 5	F	22.7	—	—	8.0	8.2	—	TET	MO 1315
5/27/97 6	G	22.9	—	—	8.1	8.0	—	—	MO 1115
5/28/97 7	H	22.3	—	—	8.0	7.9	—	—	MO 1030
5/29/97 8	A	22.7	—	—	8.1	7.6	—	TET	MO 0845
5/30/97 9	B	23.0	—	—	8.1	7.7	—	—	MO 0915
5/31/97 10	C	23.1	175/180	2.15	8.1	7.8	350	—	MO 0800

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5/21/97 0	10L	10L	10L	10L	10L	10L	10L	10L	CR 1500
5/22/97 1	N	N	N	N	N	N	N	N	CR 1030
5/23/97 2	N	N	N	N	N	N	N	N	MO 1200
5/24/97 3	N	N	N	N	N	N	N	N	MO 1345
5/25/97 4	N	N	N	N	N	N	N	N	JV 1220
5/26/97 5	N	N	N	N	N	N	N	N	MO 1315
5/27/97 6	N	N	N	N	N	N	N	N	MO 1145
5/28/97 7	N	N	N	N	N	N	N	N	MO 1100
5/29/97 8	N	N	N	N	N	N	N	N	MO 0950
5/30/97 9	N	N	N	N	N	N	N	N	MO 0930
5/31/97 10	5A,5NF	8A,2NF	6A,4NF	5A,5NF	6A,4NF	5A,5NF	5A,5NF	6A,4NF	MO 1000

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F. WESTON
SAMPLE ID: 407

PROJECT NUMBER: 3197225-0100
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (μmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	22.5	150/175	4.0	7.7	6.0	300	—	MO 1400
5/22/97 1	B	22.4	—	—	8.0	8.3	—	TET	CR 1000
5/23/97 2	C	22.5	—	—	8.0	7.9	—	—	MO 1130
5/24/97 3	D	22.7	—	—	8.1	8.2	—	—	MO 1330
5/25/97 4	E	22.7	—	—	7.8	8.2	—	—	JDY 1230
5/26/97 5	F	22.8	—	—	7.9	8.0	—	TET	MO 1315
5/27/97 6	G	22.9	—	—	8.0	7.6	—	—	MO 1115
5/28/97 7	H	22.2	—	—	8.2	7.7	—	—	MO 1030
5/29/97 8	A	22.8	—	—	8.1	7.6	—	TET	MO 0848
5/30/97 9	B	22.9	—	—	8.1	7.9	—	—	MO 0915
5/31/97 10	C	23.2	170/200	1.15	8.0	8.0	350	—	MO 0800

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5/21/97 0	10L	10L	10L	10L	10L	10L	10L	10L	MO 1500
5/22/97 1	∩	∩	∩	∩	∩	∩	∩	∩	CR 1030
5/23/97 2	∩	∩	∩	∩	∩	∩	∩	∩	MO 1200
5/24/97 3	N	N	N	N	N	N	N	N	MO 1345
5/25/97 4	N	N	N	N	N	N	N	N	JDY 1220
5/26/97 5	N	N	N	N	N	N	N	N	MO 1315
5/27/97 6	N	N	N	N	N	N	N	N	MO 1145
5/28/97 7	N	N	N	N	N	N	N	N	MO 1100
5/29/97 8	N	N	N	N	N	N	N	N	MO 0900
5/30/97 9	N	N	N	N	N	N	N	N	MO 0930
5/31/97 10	7A, 3NF	7A, 3NF	9A, 1NF	MO 5/31/97 ~~5A, 5NF~~ 6A, 4NF	10A	7A, 3NF	10A	10A	MO 0945

Comments:

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F WESTON
SAMPLE ID: 402
PROJECT NUMBER: 3197225-0100
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	22.5	127/160	<0.1	7.8	6.8	340	—	MO 1400
5/22/97 1	B	22.6	—	—	7.9	8.1	—	TET ~~YTC~~ MO 5/23/97	CR 1000
5/23/97 2	C	22.6	—	—	7.9	7.7	—	—	MO 1130
5/24/97 3	D	22.7	—	—	8.0	8.0	—	—	MO 1330
5/25/97 4	E	22.7	—	—	8.0	8.4	—		JDY 1230
5/26/97 5	F	22.8	—	—	8.1	8.1	—	TET	MO 1315
5/27/97 6	G	22.8	—	—	8.1	6.9	—	—	MO 1115
5/28/97 7	H	22.2	—	—	8.1	7.7	—	—	MO 1030
5/29/97 8	A	22.9	—	—	8.2	7.5	—	TET	MO 0845
5/30/97 9	B	23.0	—	—	8.1	7.6	—	—	MO 0915
5/31/97 10	C	23.2	155/200	<0.1	8.1	7.9	390	—	MO 0800

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5/21/97 0	10L	10L	10L	10L	10L	10L	10L	10L	MO 1500
5/22/97 1	⌒	⌒	⌒	⌒	⌒	⌒	⌒	⌒	CR 1030
5/23/97 2	⌒	⌒	⌒	⌒	⌒	⌒	⌒	⌒	MO 1200
5/24/97 3	N	N	N	N	N	N	N	N	MO 1345
5/25/97 4	N	N	N	N	N	N	N	N	JDY 1220
5/26/97 5	N	N	N	N	N	N	N	N	MO 1315
5/27/97 6	N	N	N	N	N	N	N	N	MO 1145
5/28/97 7	N	N	N	N	N	N	N	N	MO 1100
5/29/97 8	N	N	N	N	N	N	N	N	MO 0900
5/30/97 9	N	N	N	N	N	N	N	N	MO 0930
5/31/97 10	7A,3NF	8A,2NF	10A	8A,2NF	9A,1NF	7A,3NF	8A,1D,1NF	8A,2NF	MO 0915

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: ROY F WESTON
SAMPLE ID: 404

PROJECT NUMBER: 3197225-0100
TEST SPECIES: *~~H azte~~ C. tentan[illegible]

DATE-DAY	REP	TEMP (°C)	HARD/ ALK	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	23.2	150/155	1.70	7.7	6.7	340 —	—	MO 1400
5/22/97 1	B	22.7	—	—	7.7	8.2	—	TET ~~YTC~~ MO 5/28/97	JR 1000
5/23/97 2	C	22.5	—	—	7.8	7.7	—	—	MO 1130
5/24/97 3	D	22.7	—	—	7.9	7.8	—	—	MO 1330
5/25/97 4	E	22.8	—	—	7.8	7.8	—		JW 1230
5/26/97 5	F	22.9	—	—	7.9	7.7	—	TET	MO 1315
5/27/97 6	G	23.0	—	—	8.0	7.2	—	—	MO 1115
5/28/97 7	H	22.3	—	—	8.0	7.8	—	MO 5/28/97 ~~FED~~ —	MO 1030
5/29/97 8	A	22.9	—	—	7.9	7.2	—	TET	MO 0845
5/30/97 9	B	23.0	—	—	8.0	7.9	—	—	MO 0915
5/31/97 10	C	23.2	180/190	2.0	8.0	7.7	385	—	MO 0800

OBSERV DATE-DAY	REPLICATE A	B	C	D	E	F	G	H	Initial
5/21/97 0	10L	10L	10L	10L	10L	10L	10L	10L	MO 1500
5/22/97 1	⌒	⌒	⌒	⌒	⌒	⌒	⌒	⌒	JR 1030
5/23/97 2	⌒	⌒	⌒	⌒	⌒	⌒	⌒	⌒	MO 1200
5/24/97 3	N	N	N	N	N	N	N	N	MO 1345
5/25/97 4	N	N	N	N	N	N	N	N	JW 1220
5/26/97 5	N	N	N	N	N	N	N	N	MO 1315
5/27/97 6	N	N	N	N	N	N	N	N	MO 1145
5/28/97 7	N	1 EMR	N	N	1 EMR	N	N	N	MO 1100
5/29/97 8	N	N	N	1 EMR	N	N	N	N	MO 0900
5/30/97 9	N	N	N	N	N	N	N	N	MO 0930
5/31/97 10	7A, 3NF	9A, 1NF	10A	8A, 2NF	9A, 1NF	8A 1D, 1NF	10A	8A, 2NF	MO 0845

Comments:

KEY: AS = AT SURFACE N = NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT F[illegible]D
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

L = loaded

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Lab: Gainesville, FL

QA FORM NO: 108B
EFFECTIVE: MARCH 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET - WATER QUALITY

SPONSOR: Roy F. Weston
SAMPLE ID: Control
PROJECT NUMBER: 3197225-0100
TEST SPECIES: C. tentans

DATE-DAY	REP	TEMP (°C)	HARD/ ALK(mg/L)	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
5/21/97 0	A	23.2	79/63	<0.1	8.0	8.1	340	—	MO 1400
5/22/97 1	B	22.8	—	—	7.6	8.4	—	TET	CR 1000
5/23/97 2	C	23.1	—	—	7.9	8.4	—	—	CR 1130
5/24/97 3	D	22.8	—	—	8.0	8.3	—	—	MO 1330
5/25/97 4	E	23.2	—	—	7.7	8.4	—	—	JOY 1230
5/26/97 5	F	23.0	—	—	7.8	8.1	—	TET	MO 1315
5/27/97 6	G	22.9	—	—	7.9	8.0	—	—	MO 1115
5/28/97 7	H	22.3	—	—	8.0	7.8	—	—	MO 1030
5/29/97 8	A	23.0	—	—	8.2	8.1	—	TET	MO 0845
5/30/97 9	B	23.1	—	—	8.0	8.0	—	—	MO 0915
5/31/97 10	C	23.3	84/74	<0.1	8.1	7.9	355	—	MO 0800

OBSERV	REPLICATE								
DATE-DAY	A	B	C	D	E	F	G	H	Initial
5/21/97 0	10L	10L	10L	10L	10L	10L	10L	10L	MO 1500
5/22/97 1	N	N	2EMR	N	N	N	N	N	CR 1030
5/23/97 2	2EMR	1EMR	N	N	N	N	N	N	CR 1000
5/24/97 3	1EMR	N	N	1EMR	N	N	1EMR	N	MO 1345
5/25/97 4	2EMR	N	N	1EMR	N	N	1EMR	1EMR	JOY 1220
5/26/97 5	1EMR	1EMR	N	N	1EMR	2EMR	1EMR	N	MO 1315
5/27/97 6	1EMR	N	1EMR	1EMR	N	1EMR	N	1EMR	MO 1145
5/28/97 7	N	1EMR	1EMR	1EMR	N	N	1EMR	1EMR	MO 1100
5/29/97 8	1EMR	N	1EMR	N	N	1EMR	1EMR	N	MO 0900
5/30/97 9	N	N	N	N	1EMR	1EMR	N	N	MO 0930
5/31/97 10	9A, 1NF	9A, 1NF	7A, 3NF	7A, 3NF	8A, 2NF	8A, 2NF	8A, 2NF	10A	MO 0815

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

L = Loaded

[redacted]

AR301044

Environme..al Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ______
ESE QA Form: 097A
Effective: August 1994

SUBJECT: TOXICITY TEST DATA SHEET

Client: Roy F Weston | Project Number: 3197225-0100

Test Material	Test Conditions
See Page ______ of Sample Receipt Log Test Material Information	[ ] Preliminary [X] Definitive [ ] Screening — [X] Static [ ] Flow-through — Duration : 10 days

Test Animal History

Species : C. tentans
Batch Number : 97-38
Age / Life Stage : 2nd instar
Date Acclimation / Maintenance Began : 5/21/97
See Page 180 of Invertebrate Holding Log for raw data.
Mortality (%) 48 Hrs prior to testing: <1 %

Test Area Used	Temperature (C)	Salinity (ppt)
Waterbath 8	23 +/- 1	NA +/-

Dilution Water: moderately Hard water.

Lighting : [X] Fluorescent [ ] Incandescent
Photoperiod : 16 hr Light : 8 hr Dark

Test Container Dimensions (cm): 7 L x — W x 13 H
Test Solution Height : 6.5 cm
Test Containers : [ ] Open [X] Covered
Test Container Volume : 0.47 Liters
Diluent Volume : 0.175 Liters

Reps / Concentration : 8
Animals / Replicate : 5

Protocol Followed: EPA/600/R-94/024

Concentrations Based on: [ ] A.I. [X] W.M.

Container Composition: [X] Glass [ ] Plastic

Test Concentrations: (Units = %):	Control												
Amount Overlying Water ~~Reference Soil~~ Added (mL):	175	175	175	175	175	175	175	175	175	175	175	175	175
Amount Test Soil Added (mL):	100 ~~N/A~~	100	100	100	100	100	100	100	100	100	100	100	100.

Additional Observations: ______

Data MO Date: 5/21/97

FORM: Soil94

AR301045

Appendix C: *Chironomus tentans* Sediment Toxicity Test Raw Data

Avtex Fibers--Hyalella growth with reference
File: a:\avtex.h5 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Reference	0.180	0.180		
2	45	0.170	0.170	0.613	
3	606	0.138	0.138	2.606	*
4	44	0.000	0.000	11.037	*
5	403	0.171	0.171	0.537	

Dunnett table value = 2.25 (1 Tailed Value, P=0.05, df=30,4)

Avtex Fibers--Hyalella growth with reference
File: a:\avtex.h5 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Reference	8			
2	45	8	0.037	20.4	0.010
3	606	8	0.037	20.4	0.043
4	44	8	0.037	20.4	0.1[illegible]
5	403	8	0.037	20.4	0.0[illegible]

[redacted]

Avtex Fibers--Hyalella growth with reference
File: a:\avtex.h5 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	4	0.182	0.045	42.752
Within (Error)	35	0.037	0.001	
Total	39	0.219		

Critical F value = 2.69 (0.05,4,30)
Since F > Critical F REJECT Ho: All equal

[redacted]

Avtex Fibers--Hyalella length with reference
File: a:\avtex.15 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Reference	2.988	2.988		
2	606	2.625	2.625	4.033	*
3	608	2.875	2.875	1.252	

Dunnett table value = 2.03 (1 Tailed Value, P=0.05, df=20,2)

Avtex Fibers--Hyalella length with reference
File: a:\avtex.15 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Reference	8			
2	606	8	0.182	6.1	0.362
3	608	8	0.182	6.1	0.112

[redacted]

vtex Fibers--Hyalella length with reference
ile: a:\avtex.15 Transform: NO TRANSFORMATION

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	2	0.551	0.275	8.521
ithin (Error)	21	0.679	0.032	
otal	23	1.230		

Critical F value = 3.47 (0.05,2,21)
Since F > Critical F REJECT Ho: All equal

[redacted]

Avtex Fibers--Hyalella growth with reference
File: a:\avtex.h5 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Reference	0.180	0.180		
2	45	0.170	0.170	0.613	
3	606	0.138	0.138	2.606	*
4	44	0.000	0.000	11.037	*
5	403	0.171	0.171	0.537	

Dunnett table value = 2.25 (1 Tailed Value, P=0.05, df=30,4)

Avtex Fibers--Hyalella growth with reference
File: a:\avtex.h5 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Reference	8			
2	45	8	0.037	20.4	0.010
3	606	8	0.037	20.4	0.043
4	44	8	0.037	20.4	0.18[illegible]
5	403	8	0.037	20.4	0.0[illegible]

[redacted]

vtex Fibers--Hyalella growth with reference
ile: a:\avtex.h5 Transform: NO TRANSFORMATION

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	4	0.182	0.045	42.752
ithin (Error)	35	0.037	0.001	
otal	39	0.219		

Critical F value = 2.69 (0.05,4,30)
Since F > Critical F REJECT Ho: All equal

[redacted]

Avtex Fibers -- Hyalella azteca survival with reference
File: a:\avtex.h6 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	reference	10.000	10.000		
2	control	9.250	9.250	1.056	
3	45	8.750	8.750	1.761	
4	402	9.875	9.875	0.176	
5	607	9.125	9.125	1.232	
6	44	0.000	0.000	14.086	*
7	606	5.250	5.250	6.691	*
8	605	9.750	9.750	0.352	
9	403	9.750	9.750	0.352	
10	608	4.375	4.375	7.923	*

Dunnett table value = 2.48 (1 Tailed Value, P=0.05, df=60,9)

Avtex Fibers -- Hyalella azteca survival with reference
File: a:\avtex.h6 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONT
1	reference	8			
2	control	8	1.761	17.6	0.750
3	45	8	1.761	17.6	1.250
4	402	8	1.761	17.6	0.125
5	607	8	1.761	17.6	0.875
6	44	8	1.761	17.6	10.000
7	606	8	1.761	17.6	4.750
8	605	8	1.761	17.6	0.250
9	403	8	1.761	17.6	0.250
10	608	8	1.761	17.6	5.625

[redacted]

vtex Fibers -- Hyalella azteca survival with reference
'ile: a:\avtex.h6   Transform: NO TRANSFORM

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	9	801.862	89.096	44.193
ithin (Error)	70	141.125	2.016	
otal	79	942.987		

Critical F value = 2.04 (0.05,9,60)
Since F > Critical F REJECT Ho: All equal

[redacted]

Avtex Fibers--Hyalella growth (length)
File: a:\avtex.12 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	3.000	3.000		
2	45	3.038	3.038	-0.996	
3	405	3.150	3.150	-3.984	
4	44	0.000	0.000	79.684	*

Dunnett table value = 2.17 (1 Tailed Value, P=0.05, df=24,3)

Avtex Fibers--Hyalella growth (length)
File: a:\avtex.12 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	8			
2	45	8	0.082	2.7	-0.038
3	405	8	0.082	2.7	-0.150
4	44	8	0.082	2.7	3.000

[redacted]

vtex Fibers--Hyalella growth (length)
ile: a:\avtex.12 Transform: NO TRANSFORM

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	3	56.371	18.790	3314.197
ithin (Error)	28	0.159	0.006	
otal	31	56.530		

Critical F value = 2.95 (0.05,3,28)
Since F > Critical F REJECT Ho: All equal

[redacted]

Avtex Fibers -- Hyalella azteca growth (length)
File: a:avtex.l1   Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2   Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	3.013	3.013		
2	404	3.475	3.475	-6.509	
3	407	3.263	3.263	-3.518	
4	402	3.300	3.300	-4.046	
5	607	3.013	3.013	0.000	
6	410	2.988	2.988	0.352	
7	606	2.625	2.625	5.453	*
8	605	3.225	3.225	-2.991	
9	403	3.013	3.013	-0.000	
10	608	2.875	2.875	1.935	

Dunnett table value = 2.48   (1 Tailed Value, P=0.05, df=60,9)

Avtex Fibers -- Hyalella azteca growth (length)
File: a:avtex.l1   Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2   Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	8			
2	404	8	0.176	5.8	-0.462
3	407	8	0.176	5.8	-0.250
4	402	8	0.176	5.8	-0.288
5	607	8	0.176	5.8	0.000
6	410	8	0.176	5.8	0.025
7	606	8	0.176	5.8	0.387
8	605	8	0.176	5.8	-0.212
9	403	8	0.176	5.8	-0.000
10	608	8	0.176	5.8	0.137

[redacted]

vtex Fibers -- Hyalella azteca growth (length)
ile: a:avtex.11 Transform: NO TRANSFORMATION

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	9	4.240	0.471	23.327
ithin (Error)	70	1.414	0.020	
otal	79	5.654		

Critical F value = 2.04 (0.05,9,60)
Since F > Critical F REJECT Ho: All equal

[redacted]

9	403	8	0.048	25.8	0.014
10	608	8	0.048	25.8	0.037

Avtex Fibers--Hyalella growth
File: a:\avtex.h4 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	3	0.211	0.070	180.221
Within (Error)	28	0.011	0.000	
Total	31	0.222		

Critical F value = 2.95 (0.05,3,28)
Since F > Critical F REJECT Ho: All equal

Avtex Fibers--Hyalella growth
File: a:\avtex.h4 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	0.185	0.185		
2	45	0.170	0.170	1.517	
3	405	0.203	0.203	-1.770	
4	44	0.000	0.000	18.710	*

Dunnett table value = 2.17 (1 Tailed Value, P=0.05, df=24,3)

Avtex Fibers--Hyalella growth
File: a:\avtex.h4 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	8			
2	45	8	0.021	11.6	0.015
3	405	8	0.021	11.6	-0.018
4	44	8	0.021	11.6	0.18[illegible]

[redacted]

vtex Fibers -- Hyalella azteca growth
ile: a:\avtex.h2 Transform: NO TRANSFORMATION

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	9	0.301	0.033	22.627
ithin (Error)	70	0.104	0.001	
otal	79	0.405		

Critical F value = 2.04 (0.05,9,60)
Since F > Critical F REJECT Ho: All equal

vtex Fibers -- Hyalella azteca growth
ile: a:\avtex.h2 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

ROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	0.185	0.185		
[illegible]	404	0.340	0.340	-8.058	
[illegible]	407	0.289	0.289	-5.394	
4	402	0.249	0.249	-3.314	
5	607	0.181	0.181	0.195	
6	410	0.180	0.180	0.260	
7	606	0.138	0.138	2.469	
8	605	0.218	0.218	-1.690	
9	403	0.171	0.171	0.715	
10	608	0.148	0.148	1.950	

unnett table value = 2.48 (1 Tailed Value, P=0.05, df=60,9)

vtex Fibers -- Hyalella azteca growth
ile: a:\avtex.h2 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

ROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	8			
2	404	8	0.048	25.8	-0.155
3	407	8	0.048	25.8	-0.104
[illegible]	402	8	0.048	25.8	-0.064
[illegible]	607	8	0.048	25.8	0.004
6	410	8	0.048	25.8	0.005
7	606	8	0.048	25.8	0.047
8	605	8	0.048	25.8	-0.033

[redacted]

Avtex Fibers--Hyalella survival
File: a:\avtex.h3 Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	3	491.594	163.865	100.015
Within (Error)	28	45.875	1.638	
Total	31	537.469		

Critical F value = 2.95 (0.05,3,28)
Since F > Critical F REJECT Ho: All equal

Avtex Fibers--Hyalella survival
File: a:\avtex.h3 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	9.250	9.250		
2	45	8.750	8.750	0.781	
3	405	9.125	9.125	0.195	
4	44	0.000	0.000	14.453	*

Dunnett table value = 2.17 (1 Tailed Value, P=0.05, df=24,3)

Avtex Fibers--Hyalella survival
File: a:\avtex.h3 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	8			
2	45	8	1.389	15.0	0.500
3	405	8	1.389	15.0	0.125
4	44	8	1.389	15.0	9.250

Avtex Fibers -- Hyalella azteca survival
File: a:\avtex.h1 Transform: NO TRANSFORMATION

ANOVA TABLE

[redacted]

OURCE	DF	SS	MS	F
etween	9	315.450	35.050	19.093
hin (Error)	70	128.500	1.836	
otal	79	443.950		

Critical F value = 2.04 (0.05,9,60)
Since F > Critical F REJECT Ho: All equal

vtex Fibers -- Hyalella azteca survival
ile: a:\avtex.h1 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

ROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	9.250	9.250		
2	404	10.000	10.000	-1.107	
3	407	9.875	9.875	-0.923	
4	402	9.875	9.875	-0.923	
5	607	9.125	9.125	0.185	
6	410	10.000	10.000	-1.107	
7	606	5.250	5.250	5.905	*
[illegible]	605	9.750	9.750	-0.738	
[illegible]	403	9.750	9.750	-0.738	
10	608	4.375	4.375	7.196	*

unnett table value = 2.48 (1 Tailed Value, P=0.05, df=60,9)

vtex Fibers -- Hyalella azteca survival
ile: a:\avtex.h1 Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

ROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	8			
2	404	8	1.680	18.2	-0.750
3	407	8	1.680	18.2	-0.625
4	402	8	1.680	18.2	-0.625
5	607	8	1.680	18.2	0.125
6	410	8	1.680	18.2	-0.750
7	606	8	1.680	18.2	4.000
8	605	8	1.680	18.2	-0.500
9	403	8	1.680	18.2	-0.500
[illegible]	608	8	1.680	18.2	4.875

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: Roy F Weston	SAMPLE ID: 405
PROJECT NUMBER: 3197225-0100	TEST SPECIES: H. azteca

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	2.9	1	B	3.3	1	C	3.5	1	D	3.6
2		3.1	2		2.9	2		3.2	2		3.2
3		3.5	3		3.2	3		3.3	3		3.0
4		3.1	4		2.9	4		3.1	4		3.3
5		2.9	5		2.8	5		3.2	5		3.3
6		3.0	6		2.9	6		3.1	6		3.0
7		3.2	7		3.4	7		2.9	7		3.4
8		2.2	8		2.8	8		2.9	8		2.9
—		—	9		3.4	—		—	9		3.5
—		—	10		3.0	—		—	10		3.0
AVERAGE STD. DEV. RANGE		3.0 0.37 2.2-3.5	AVERAGE STD. DEV. RANGE		3.1 0.24 2.8-3.4	AVERAGE STD. DEV. RANGE		3.2 0.20 2.9-3.5	AVERAGE STD. DEV. RANGE		3.2 0.24 2.9-3.6
1	E	3.0	1	F	3.4	1	G	3.1	1	H	3.2
2		2.7	2		3.1	2		3.0	2		3.1
3		3.1	3		3.1	3		3.4	3		3.4
4		3.2	4		3.2	4		3.4	4		3.0
5		3.0	5		3.2	5		3.3	5		3.4
6		3.0	6		3.0	6		3.4	6		3.0
7		3.2	7		3.3	7		3.7	7		2.8
8		3.1	8		3.3	8		3.3	—		—
9		3.5	9		3.1	9		3.0	—		—
10		3.4	10		3.4	10		3.1	—		—
AVERAGE STD. DEV. RANGE		3.1 0.22 2.7-3.5	AVERAGE STD. DEV. RANGE		3.2 0.14 3.0-3.4	AVERAGE STD. DEV. RANGE		3.3 0.22 3.0-3.7	AVERAGE STD. DEV. RANGE		3.1 0.22 2.8-3.4

Measuring Device: Micrometer	Calculator: RS-DAE
Data By: mo Date: 6/4/97	Reviewed By: Date:

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Department
Gainesville, Florida

QA FORM: 017C
EFFECTIVE:

SUBJECT: TEST ORGANISM GROWTH

SPONSOR: Roy F weston	SAMPLE ID: 45
PROJECT NUMBER: 3197225-0100	TEST SPECIES: H. azteca

ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)	ORG #	REP	Length (mm)
1	A	2.8	1	B	3.1	1	C	3.0	1	D	2.9
2		3.0	2		3.0	2		2.8	2		2.3
3		3.0	3		3.2	3		3.4	3		3.5
4		3.4	4		3.4	4		3.2	4		3.0
5		3.2	5		3.4	5		3.0	~~8~~ 5		3.2
6		3.0	6		2.5	6		3.2	6		3.0
7		3.3	7		3.0	7		3.4	7		3.6
—		—	8		2.5	8		2.7	8		2.7
—		—	9		3.1	9		2.8	9		3.2
—		—	10		3.0	10		3.3	10		2.9
AVERAGE STD. DEV. RANGE		3.1 0.21 2.8-3.4	AVERAGE STD. DEV. RANGE		3.0 0.31 2.5-3.4	AVERAGE STD. DEV. RANGE		3.1 0.26 2.7-3.4	AVERAGE STD. DEV. RANGE		3.0 0.38 2.3-3.6
1	E	2.8	1	F	3.1	1	G	3.6	1	H	3.7
2		2.8	2		3.0	2		2.8	2		3.2
3		3.0	3		3.5	3		3.0	3		2.6
4		2.9	4		3.2	4		2.9	4		3.1
5		2.9	5		3.0	5		3.1	5		3.2
6		3.1	6		2.7	6		3.0	6		3.3
7		2.6	7		3.4	7		3.1	7		2.8
8		3.0	8		2.9	8		2.9	—		—
—		—	9		2.0	—		—	—		—
—		—	10		2.8	—		—	—		—
AVERAGE STD. DEV. RANGE		2.9 0.16 2.6-3.1	AVERAGE STD. DEV. RANGE		3.0 0.42 2.0-3.5	AVERAGE STD. DEV. RANGE		3.1 0.24 2.8-3.6	AVERAGE STD. DEV. RANGE		3.1 0.35 2.6-3.7

Measuring Device: Micrometer	Calculator: RS-DAE
Data By: MO Date: 6/4/97	Reviewed By: Date:

[redacted]

Environmental Science & Engineering DATE 05/30/97 STATUS : PAGE 3
PROJECT NUMBER 1297323V L202 PROJECT NAME TOC FOR BIOASSAY
FIELD GROUP JOYT PROJECT MANAGER KAREN HATFIELD
ALL ALL LAB COORDINATOR KAREN HATFIELD

SAMPLE ID'S PARAMETERS UNITS	STORET METHOD	CONTROL JOYT 21
DATE		05/19/97
TIME		
MOISTURE %WET WT	70320 ASTM-G	20.0
ORGANIC CONTENT,TOTAL AT 440 C %-DRY	99016 ASTM-G	<0.5
CARBON,TOC,ASOC/1.724 % DRY WT	80153 CALC	<0.290

FINAL REPORT:

TOXICITY ASSESSMENT OF SOIL SAMPLES FROM THE AVTEX FIBERS SUPERFUND SITE, FRONT ROYAL, VIRGINIA, WITH THE LUMBRICID EARTHWORM, *EISENIA FOETIDA*

TEST GUIDELINE:

EPA-600/3-88/029

PREPARED FOR:

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PERFORMING LABORATORY:

QST Environmental Inc.
404 SW 140th Terrace
Newberry, Florida 32669-3000
Phone: (352) 332-3318

STUDY ID:

Roy F. Weston No. 3347-041-001-1215
QST No. 3192225-0100-3100

September 1997

EXECUTIVE SUMMARY

Whole soil toxicity tests were conducted at QST Environmental Inc. in Gainesville, Florida, with the lumbricid earthworm, *Eisenia foetida*, on samples collected from the Avtex Fibers Superfund Site, Front Royal, Virginia. The effect criteria for the toxicity tests were survival and bioaccumulation potential. A total of five site soils, one field reference soil, and two laboratory control soils were used in the toxicity tests. After 14 days of exposure no sub-chronic toxicity was noted in any of the samples. There were no significant differences (P=0.05) in the survival of *Eisenia foetida* between the laboratory control soils and the field reference soil from sample station 11-215-00501. There were no significant differences (P=0.05) in the survival of *Eisenia foetida* between the laboratory control soils and the reference soil when compared with survival in the site samples. After the 14-day sub-chronic exposure period, the earthworms were held in the test samples for an additional 14 days to determine the bioaccumulation potential for selected site contaminants. No chronic toxicity was noted throughout the 14-day exposure period. Frozen *Eisenia foetida* tissues were sent to Roy F. Weston, Inc. for chemical analyses. Percent organic matter content of the site soils used in the toxicity tests ranged from 3.8 percent (sample 11-215-00502 from the wetland area) to 29.4 percent (sample 11-215-00506 from the fly ash pile).

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1.0 INTRODUCTION

Whole soil toxicity tests were conducted at QST Environmental Inc. (formerly Environmental Science & Engineering, Inc.) with soil samples collected from the Avtex Fibers Superfund Site, Front Royal, Virginia, to determine the relative toxicity and bioaccumulation potential of the contaminants in the test samples. The test organism used for soil tests was the lumbricid earthworm, *Eisenia foetida*. The effect criteria for the toxicity tests were survival and bioaccumulation potential. Growth was also measured as wet weight in milligrams.

The tests were conducted following ASTM Guideline E 1676-95, EPA/600/3-88/029, Roy F. Weston, Inc. protocols, and QST in-house standard operating procedures. All of the original raw data pertaining to this study are maintained at QST, 404 SW 140th Terrace, Newberry, Florida 32669-3000.

2.0 MATERIALS AND METHODS

2.1 TEST SAMPLES

Test soils were collected as grab samples from the Avtex Fibers Superfund Site by Roy F. Weston, Inc. personnel on May 15, 1997, and were received at the QST laboratory on May 17, 1997. The test samples, identified as 11-215-00501 (reference), 11-215-00502, 11-215-00503, 11-215-00504, 11-215-00505, and 11-215-00506, were collected from the reference area, wetland area, emergency pond, PCB area, treatment plant and fly ash area, respectively. Samples were received in quantities of approximately 5 gallons each in a five gallon pail. Additional soil samples were received in 8 ounce glass jars and used for percent organic matter determination. Upon receipt, the pails were opened and the contents checked against the chain-of-custody sheets to ensure that all the recorded samples were present. The temperature of the samples was then measured. Any observations made during the sample receipt and log-in operations were recorded in the sample receipt logbook. Chain-of-custody and other traffic information pertaining to the samples are presented in Appendix A. Laboratory control soil for the earthworm bioassays was artificial soil comprising 10% sphagnum peat (Alachua County Feed and Seed Store, Gainesville, FL), 20%

[redacted]

kaolinite clay, and 70% grade 70 silica sand (both from Feldspar Corporation, Edgar, FL). Two laboratory control soils were used in the toxicity tests. All samples were stored in a refrigerator at 4 ± 2 °C prior to use and during the testing period. The tests were initiated on May 19, 1997, within 48 hours of sample receipt.

2.2 TEST ORGANISMS

The earthworms, *E. foetida*, used in the toxicity tests were obtained from Carolina Biological Supply Company (Burlington, North Carolina). The test organisms were > 60 day old adults, weighing between 300 - 500 mg each, and fully clitellate at test initiation. All organisms were obtained from the same culture. The supplier's breeding and holding conditions were similar to those of the testing conditions therefore, the earthworms were held <24 hours prior to use in the toxicity tests.

2.3 MOISTURE FRACTION DETERMINATION

Upon receipt of the soil samples, a 20 gram sub-sample of each site, reference, and laboratory control soil was removed from the receiving container and placed in a dried, preweighed, numbered aluminum pan. The sub-sample was dried in a Blue-M oven at 100 °C for approximately 24 hours. The final dry weight (x) was subtracted from the initial wet weight (y) of the sub-sample and divided by the sub-sample weight (20 grams) to obtain the moisture fraction of the soil (equation: y-x grams/20 grams).

2.4 WATER HOLDING CAPACITY DETERMINATION

Sub-samples (10 grams) of the dry soils were placed in a 30 mL beaker, and an equal weight of deionized water was added and mixed into a slurry. A crepe paper filter, folded into quarters, was placed in a plastic funnel and evenly hydrated with deionized water. The weight of the funnel and hydrated paper was measured (x grams). The funnel was then set on a beaker and the soil slurry poured into the funnel; a minimal amount of deionized water was used to lightly rinse any remaining soil from the beaker and stir rod. Aluminum foil was placed over the funnel and the system was allowed to drain for approximately 3 hours at room temperature. The final weight of the funnel was measured (y grams) and the water holding capacity was determined (equation: x grams - y grams).

2.5 HYDRATION OF SOILS

Test soils were hydrated to 75 percent of their water holding capacity with deionized water prior to use in the toxicity tests. The amount of deionized water added to each individual test soil was determined according to the following equation:

Hydration water to be added (mL/100 g) = THW - EHW

THW (total hydration water desired, mL/100 g) =
PHYD x [(PAS x WHC_{as} + (PWS x WHC_{ts})]

EHW (existing hydration water, mL/100 g) =
[(PAS x MF_{as}) + (PWS x MF_{ts})] x 100

where PHYD = proportion of hydration required (e.g. 0.75)
PAS = proportion of artificial soil in test soil (e.g.. 0.5)
WHC_{as} = water holding capacity of the artificial soil in mL/100 g
PWS = proportion of waste sample (dilution) in the test soil
WHC_{ts} = water holding capacity of the test sample in mL/100 g
MF_{as} = moisture fraction of the artificial soil
MF_{ts} = moisture fraction of the test sample

Soil samples with excess moisture content were allowed to air-dry at room temperature prior to use in the toxicity tests.

2.6 TOXICITY TEST DESIGN

The *Eisenia foetida* tests were 14-day survival bioassays with an additional 14-day exposure for bioaccumulation potential determination using test soils from the Avtex Fibers Superfund Site sample stations referenced above. The site, reference, and laboratory control soils were used without dilution. Approximately 1,400 grams of a thoroughly homogenized soil, hydrated to 75 percent of its water holding capacity, were placed into each of three replicate test chambers (labeled replicate A, B and C). The test chambers used were 3.78 L glass jars covered with a plastic sheet with air holes on top to allow for air exchange. To initiate the tests, 70 worms were randomly selected, weighed, and loaded on top of each replicate test, field reference, or control soil and allowed to burrow into the soil. The worms in each exposure jar were then observed for 24 hours for any unusual behavior (e.g. lack of burrowing, inactive posture on surface) and pathological symptoms (e.g. hemorrhaging, swelling, elongation). The tests were conducted at room temperature, 20 ± 2 °C, with a daily photoperiod of continuous laboratory illumination (520 Lux). Test temperature was measured continuously by placing the probe of a Supco continuous temperature monitor into a temperature control jar containing 200 grams of hydrated control soil. Soil pH was measured on day 0 and day 28 by evenly mixing 5 grams of test or control soil with 25 mL of deionized water for 30 minutes. The pH was then measured using an Orion SA 290 pH meter equipped with an Orion 91-57 triode.

At 7-day intervals, the contents of each replicate chamber were emptied onto a glass pan to observe and enumerate the test organisms. The worms were counted and observed for mortality, hemorrhaging, swelling, and elongation. The presence of eggs and/or young in the tests soils was also noted. Earthworms were considered to be dead if they did not respond to a gentle mechanical stimulus (e.g. touch with a small spatula at the anterior end). The soils were rehydrated, when necessary, returned to the test chambers, and the worms reloaded on top of the soil. Test organisms were not fed during the initial 13 days of testing, however, on day 14 approximately 21 grams of aged, ground alfalfa pellets (Alachua County Feed and Seed Store, Gainesville, FL) were added to each replicate test, reference, and control chamber following organism observation. On day 28, all organisms were removed from the test chambers, observed, counted, and weighed. The organisms in each replicate were cleaned and kept on wet filter paper in Ziploc® bags for approximately 24 hours to purge their gut contents.

After depuration, the earthworms were prepared for shipment to Roy F. Weston, Inc. for chemical analyses. Test organisms from each replicate sample were cleaned and placed together in 8 ounce amber glass jars, labeled with the sample identification number, replicate number, date and sponsor's name, and frozen. The frozen samples were then shipped on dry ice under chain-of-custody to Roy F. Weston, Inc. for chemical analyses. Chain-of-custody documentation and other traffic information are provided in Appendix A.

2.7 REFERENCE TOXICANT TEST

A reference toxicant test using 2-chloroacetamide as the reference toxicant was performed concurrently with the toxicity tests to determine the general condition of the earthworms used in the toxicity tests. The concentrations of 2-chloroacetamide selected for the reference toxicant test were 0 (control), 8, 16, 32, 64 and 128 μg/L. A stock solution of reference toxicant was prepared in deionized water and mixed with control soil to the desired concentrations. Ten *E. foetida* were exposed per control or reference toxicant concentration for 7 days without any replication. The reference toxicant tests were performed under the same conditions as the toxicity tests.

2.8 DETERMINATION OF ORGANIC CONTENT

The percent organic matter and moisture contents of the site and field reference soils were determined using the guidelines in *Standard Method for Determination of Organic Content in Soils by Loss on Ignition*, (AASHTO DESIGNATION: T 267-86). Samples were oven dried at 110 °C to constant weight and then allowed to cool at room temperature. Aliquots of the dry samples were then heated in a crucible for 6 hours at 440 $\pm$ 10 °C, cooled, and the percent organic matter determined by difference.

3.0 STATISTICAL ANALYSIS

Mean survival and growth data were evaluated by a statistical comparison of the Avtex Fibers Superfund Site samples with the reference and laboratory control samples using appropriate statistical procedures. Analysis of variance followed by the Duncan's Multiple Range Test (Snedecor and Cochran, 1980), and Dunnett's t-test (EPA, 1988; Gulley and WEST, Inc. 1994) were used to determine statistical significance. The median lethal concentration (LC_{50}), the concentration of reference toxicant which causes 50 percent mortality of the test organisms under the specified conditions of exposure, was calculated using the Trimmed Spearman-Karber Statistical Computer Program (Hamilton et. al., 1977).

[redacted]

4.0 RESULTS AND DISCUSSION

4.1 WHOLE SOIL TOXICITY TEST

Debris, including small stones and plant material, was removed from some of the soil samples prior to use in testing. Some indigenous earthworms were found in the soil from sample station 11-215-00501 and were removed during the sorting process. Test conditions, including lighting, temperature, and pH values remained at acceptable levels throughout the testing period. Test temperature remained in the range of 20 $\pm$ 2 °C throughout the duration of the test. No pH adjustments were made for any of the samples used for testing. pH ranged from 4.0 (laboratory control) to 8.3 standard units (11-215-00503) throughout the duration of the test (Table 1). Light intensity over the test area was measured to be 520 Lux. Copies of the relevant raw data pertaining to this test are provided in Appendix B.

Survival data for *E. foetida* after the 14-day sub-chronic exposure period and subsequent 14-day bioaccumulation phase are presented in Table 2. After 14 days of exposure, survival of *E. foetida* in the site samples ranged from 99 percent (11-215-00501, reference) to 100 percent (the remaining five site soils). This indicated that the tests soils did not show any sub-chronic toxicity. Laboratory control survivorship was 100 percent. The 14-day survival of *E. foetida* in the laboratory control and reference soils was not significantly different ($P \leq 0.05$) from survival in any of the site soils (Table 2).

The bioaccumulation phase was not meant to determine survivorship, but rather to obtain adequate earthworm tissue for chemical analyses in all of the replicates. The additional laboratory control exposures were used to obtain adequate earthworm tissue to perform matrix spike/matrix spike duplicate analysis. Some mortality was observed in samples from the reference station (11-215-00501) and the fly ash pile (11-215-00506) after the 28-day exposure period. The reference soil was clay-like in nature and the worms could not burrow into the soil, which may have accounted for some of the observed mortality. Soil from the fly ash pile loose and very dark in nature, and may have contained some intrinsic components which affected the earthworm growth. After the 28-day bioaccumulation phase, survival of *E. foetida* in the site samples ranged from 91 percent (11-

215-00504) to 100 percent (remainder of site soils). Laboratory control and reference soil survivorship were 100 and 81 percent, respectively. The 28-day survival of *E. foetida* in the laboratory control soil was not significantly different (P=0.05) from survivorship in any of the site soils.

Growth of *E. foetida* was measured as wet weight in milligrams and converted to percent based on the initial weights. Average percentage growth of *E. foetida* in the Avtex Superfund Site soils ranged from -20 percent (11-215-00506) to 43.2 percent (11-215-00505). Average laboratory control and field reference soil percentage growth were 40.4 and 2.4 percent, respectively (Table 3). Two of the site soils, 11-215-00504 and 11-215-00506, showed an overall reduction in growth. However, adequate mass of earthworm tissue was available for chemical analyses even though some of the individual replicates showed a reduction in weight (Table 3).

Behavioral observations recorded during the test included lethargy. At the end of the 28-day exposure period, there was egg and young production in several of the exposure chambers. Copies of the relevant raw data and statistical reports pertaining to this test are provided in Appendix B.

4.2 REFERENCE TOXICANT TEST

The LC_{50} of the reference toxicant test was determined to be 37.3 μg 2-chloroacetamide/L with 95 percent confidence limits of 30.1 and 46.3 μg 2-chloroacetamide/L, respectively. The LC_{50} value fell within the control limits of reference toxicant tests performed at QST, indicating that the organisms were healthy and within their normal sensitivity ranges.

4.3 DETERMINATION OF ORGANIC CONTENT

Results of the percent organic matter and moisture content determinations in the site and reference soils are presented in Table 4. Total organic matter in the site soils ranged from 3.8 (11-215-00502) percent to 29.4 percent (11-215-00506). Moisture content in the site soils ranged from 14.6 (11-215-00501) percent to 71.1 percent (11-215-00503) (Table 4).

[redacted]

5.0 CONCLUSION

Under the conditions of the study no sub-chronic toxicity was noted in any of the site, field reference, or laboratory control soils. There were no significant differences ($P \leq 0.05$) in survival of *E. foetida* between the laboratory control soil, the field reference soil, and any of the site soils collected from the Avtex Fibers Superfund Site, Front Royal, Virginia. Adequate mass of *E. foetida* tissues were available for chemical analyses in all of the soil samples. Percent total organic matter in the site soils used in the toxicity tests ranged from 3.8 to 29.4 percent.

6.0 REFERENCES

American Society for Testing and Materials. ASTM E 1676-95. *Standard Guide for Conducting a Laboratory Soil Toxicity Test with Lumbricid Earthworm, Eisenia foetida*. ASTM (11.05):1995.

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Gulley, D.D. and WEST, Inc. 1994. *Toxstat 3.4*. Department of Zoology and Physiology, University of Wyoming.

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[redacted]

Table 1. pH Values of Soil Samples From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 28-Day Toxicity Test With the Lumbricid Earthworm, *Eisenia foetida*

Sample ID	Location	pH (su)[a]	
		Day 0	Day 28
Control No. 1	Lab	4.0	7.0
Control No. 2	Lab	4.0	6.0
11-215-00501	Reference	7.6	7.5
11-215-00502	Wetland area	4.9	5.7
11-215-00503	Emergency pond	8.3	7.6
11-215-00504	PCB area	4.7	7.5
11-215-00505	Treatment plant	7.0	7.2
11-215-00506	Fly ash pile	5.6	6.2

[a] pH measured in standard units (su)

Table 2. Survival of *Eisenia foetida* Exposed to Soil Samples From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 28-Day Toxicity Test

Sample ID	Location	REP	SURVIVAL (PERCENT)[a]			
			7-DAY	14-DAY	21-DAY	28-DAY
Control No. 1	Lab	A	70	70	70	69
		B	70	70	70	70
		C	70	70	70	70
			210 (100)	210 (100)	210 (100)	209 (100)
Control No. 2	Lab	A	70	70	70	70
		B	70	70	70	70
		C	70	70	70	70
			210 (100)	210 (100)	210 (100)	210 (100)
11-215-00501	Reference	A	70	68	68	50
		B	70	70	70	55
		C	70	70	70	65
			210 (100)	208 (99)	208 (99)	170 (81)
11-215-00502	Wetland area	A	70	70	70	70
		B	70	70	70	70
		C	70	70	70	70
			210 (100)	210 (100)	210 (100)	210 (100)
11-215-00503	Emergency pond	A	70	70	70	70
		B	70	70	70	70
		C	70	70	70	70
			210 (100)	210 (100)	210 (100)	210 (100)
11-215-00504	PCB area	A	70	70	70	70
		B	70	70	70	70
		C	70	70	70	70
			210 (100)	210 (100)	210 (100)	210 (100)
11-215-00505	Treatment plant	A	70	70	70	70
		B	70	70	70	70
		C	70	70	70	70
			210 (100)	210 (100)	210 (100)	210 (100)
11-215-00506	Fly ash pile	A	70	70	70	59
		B	70	70	70	64
		C	70	70	70	69
			210 (100)	210 (100)	210 (100)	192 (91)

[a] Seventy organisms exposed per replicate

[redacted]

Table 3. Growth of *Eisenia foetida* Exposed to Soil Samples From the Avtex Fibers Superfund Site, Front Royal, Virginia, During a 28-Day Toxicity Test

Sample ID	Location	REP[a]	Initial Weight	Final Weight	Growth (%)[b]
Control No. 1	Lab	A	28.38	39.30	38.5
		B	25.83	34.90	35.1
		C	26.11	37.90	45.2
			26.77	37.36	39.6
Control No. 2	Lab	A	24.20	36.40	50.4
		B	23.70	32.30	36.3
		C	26.80	36.60	36.6
			24.90	35.10	40.9
11-215-00501	Reference	A	23.10	20.30[c]	-12.1
		B	24.30	28.28[c]	16.4
		C	25.50	26.06[c]	2.2
			24.30	24.88	2.4
11-215-00502	Wetland area	A	23.60	28.20	19.5
		B	23.25	26.10	12.3
		C	24.47	30.40	24.2
			23.77	28.23	18.8
11-215-00503	Emergency pond	A	23.30	32.00	37.7
		B	27.50	25.70	-6.5
		C	25.80	24.90	-3.4
			25.53	27.53	7.8
11-215-00504	PCB area	A	27.50	24.50	-10.9
		B	27.00	25.80	-4.4
		C	22.00	22.60	2.7
			25.50	24.30	-4.7
11-215-00505	Treatment plant	A	24.30	37.00	52.3
		B	23.60	32.90	39.4
		C	24.40	33.60	37.7
			24.1	34.50	43.2
11-215-00506	Fly ash pile	A	25.70	18.03[c]	-29.8
		B	28.90	20.83[c]	-27.9
		C	27.00	26.43[c]	-2.1
			27.20	21.76	-20.0

[a] Seventy organisms exposed per replicate
[b] Percent growth = (measured weight - initial weight)/initial weight x 100
[c] Value adjusted for mortality

[redacted]

Table 4. Percent Organic Matter and Moisture Content of Soils From the Avtex Fibers Superfund Site, Front Royal, Virginia, Used in the 28-Day Toxicity Tests

Sample ID	Location	Percent Moisture	Percent Organic Matter
Control	Lab	20.0	NA[a]
11-215-00501	Reference	14.6	6.8
11-215-00502	Wetland Area	19.5	3.8
11-215-00503	Emergency Pond	71.1	17.1
11-215-00504	PCB Area	20.8	4.7
11-215-00505	Treatment Plant	20.5	8.1
11-215-00506	Fly Ash Pile	38.6	29.4

[a]NA = not analyzed

[redacted]

Appendix A: Chain-of-Custody and Traffic Information

[redacted]

QST Environmental Inc.
Toxicology Laboratory
Gainesville, Florida

QST Form No. COC01
Revised: June 1997

CHAIN OF CUSTODY RECORD

Client: Roy F. Weston, Inc

Project Name: Avtex Fibers Superfund Site

Sample #	Tag	Matrix	Collected	Container/Preservative	Comments
Lab control 1	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	39.3 grams
"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	34.9 grams
"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	37.9 grams
Lab control 2	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	36.4 grams
"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	32.3 grams
"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	36.6 grams
11-215-00501	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	14.5 grams
"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	20.2 grams
"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	24.2 grams
11-215-00502	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	28.2 grams
"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	26.1 grams
"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	30.4 grams
11-215-00503	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	32.0 grams
"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	25.7 grams
"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	24.9 grams
11-215-00504	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	24.5 grams
"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	25.8 grams
"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	22.6 grams
11-215-00505	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	37.0 grams
"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	32.9 grams
"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	33.6 grams
11-215-00506	A	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	15.2 grams ~~32.0 Grs~~ JAY 6/18/97
"	B	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	18.4 grams
"	C	Earthworm tissue	6/18/97	8 oz glass/dry ice (-10°C)	25.3 grams

Relinquished By: Joe Owusu-Yaw Date: 6/24/97 Received By: Date:
Relinquished By: Date: Received By: Date:

[redacted]

AR301083

USEPA E

CHAIN OF CUSTODY RECORD

COC # 1-215-027

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:NA
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352)-332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	G	11-215-00501	Reference	Soil	5/15/97	5gal pail/wet ice, 4C	Earthworm Toxicity Test		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all /analysis	Mark Huston	5/16/97	J. Owusu-Yaw	5/17/97	1500						

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-028

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352)332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	G	11-215-00502	Wetland Area	Soil	5/15/97	5gal pail/wet ice, 4C	Earthworm Toxicity Test		

[redacted]

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/16/97	J. Owusu Yaw	5/17/97	1505						

AR301085

USEPA E

CHAIN OF CUSTODY RECORD

COC # 1-215-029

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352)-332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	G	11-215-00503	Emergency Pond	Soil	5/15/97	5gal pail/wet ice, 4C	Earthworm Toxicity Test		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/16/97	J. Owusu-Yaw	5/17/97	1500						

AR301086

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-030

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352) 332-3316

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	G	11-215-00504	PCB Area	Soil	5/15/97	5gal pail/wet ice, 4C	Earthworm Toxicity Test		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all / analysed	Mark Huston	5/16/97	J. Owusu-Yaw	5/19/97	1505						

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-031

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:
Lab: ESE, Inc.
Contact: Joe Owusu Yaw
(352) 332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	G	11-215-00505	Treatment Plant	Soil	5/15/97	5gal pail/wet ice, 4C	Earthworm Toxicity Test		

[redacted]

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	5/16/97	J. Owusu-Yaw	5/17/97	1500						

USEPA ERT

CHAIN OF CUSTODY RECORD

COC # 1-215-032

REAC, Edison, NJ
Contact: Mark Huston
(908) 321-4285
WO#: 03347-041-001-1215-01
EPA Contract 68-C4-0022

Project Name: Avtex Fibers Site
Location: Front Royal, Va
Site Phone:

Page No.: 1 of 1
Cooler #:
Lab: ESE, Inc.
Contact: Joe Owusu yaw
(352)332-3318

LAB #	Tag	Sample #	Location	Matrix	Collected	Container/Preservative	Analysis Requested	MS MSD	Comments
	G	11-215-00506	Fly Ash Pile	Soil	5/15/97	5gal pail/wet ice, 4C	Earthworm Toxicity Test		

Special Instructions:

REFERENCE COC:

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all/analyses	Mark Huston	5/16/97	J. Owusu Yaw	5/17/97	1500						

Appendix B: *Eisenia foetida* Soil Toxicity Test Raw Data

Project: 3197225-0100

DAILY LOG

5-17-97 CR Soil samples received + checked in. All samples placed in storage at 4±2°C except sample #503, which was allowed to air dry (determined to be too saturated for earthworms to survive). E. foetida (earthworms) were received on 5-14-97. Test organisms acclimated to test conditions, fed and substrate hydrated. On 5-17-97 soil was rotated in earthworm storage tank. Organisms in normal condition. Control soil prepared. (~~20~~ % peat, 10% kaolinite clay + 70% silica sand) CR 5-17-97

5-19-97 CR. Dried weighpans weighed + samples for MF placed in pans + Blue-M oven to initiate MF determination.

5-20-97 CR Organisms checked / soil rotated. MF + WHC determined. Soils hydrated to 75% of WHC. 1400g (homogenized) of each soil placed in 3 replicate chambers. 70 worms loaded per replicate. Chambers placed in diluter room under continuous light. LIGHT INTENSITY → 520 LUX. CTM-8 probe placed in control soil in seperate chamber to monitor room temperature.

5-21-97 CR CTM-8 reads 70°F. (21°C)

5-22-97 CR CTM-8 reads 70°F. (21°C)

[redacted]

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
ESE QA Form Number: 018
Effective: APR 1993

Project: 3197225-0100

DAILY LOG
5-23-97 MO - CTM-8 reads 70°F (21°C).
5-24-97 MO - CTM-8 reads 70°F (21°C) - all worms submerged.
5-25-97 MO - CTM-8 reads 70°F (21°C).
5-26-97 MO - CTM-8 reads 70°F (21°C).
5-27-97 MO - CTM-8 reads 70°F (21°C). Worms observed (Day 7).
5-28-97 MO - CTM-8 reads 69°F (20°C). All worms resubmerged
No soil.
5-29-97 MO - CTM-8 reads 69°F (20°C).
5-30-97 MO - CTM-8 reads 69°F (20°C). All worms submerged.
5-31-97 MO - CTM-8 reads 69°F (20°C).
6-01-97 MO - CTM-8 reads 69°F (20°C).
6-02-97 MO - CTM-8 reads 69°F (20°C).
6-03-97 JOY - CTM-8 reads 70°F (21°C). Organisms observed
and monitored. No major problems. Only 2 dead ones found.
Soils hydrated and organisms fed 21g alfalfa per rep.
6-04-97 JOY - CTM-8 reads 70°F (21°C)
6-05-97 JOY - CTM-8 reads 70°F (21°C)
6-06-97 JOY - CTM-8 reads 69°F (20°C)
6-07-97 JOY - CTM-8 reads 69°F (20°C)
6-8-97 JOY - CTM-8 reads 70°F (21°C)
6-9-97 JOY CTM-8 reads 70°F (21°C)
6-10-97 JOY CTM-8 reads 70°F (21°C) Organisms observed
and monitored. No problems. Sample #504 appears to have
less worms even though alive. Soils hydrated. No feeding.
6-11-97 JOY CTM-8 reads 70°F (21°C)
6-12-97 JOY. CTM-8 reads 70°F (21°C)
6-13-97 JOY CTM-8 reads 70°F (21°C)

[redacted] AR301092

QST Environmental Inc.
Toxicology Laboratory
Gainesville, Florida

Page: ______
QST QA Form No. 018
Revised: June 1997

Project No: 3197225-0100-3100 Avtex Fibers

DAILY LOG

6/14/97 JOY CTM-8 reads 70°F (21°C)

6/15/97 JOY CTM-8 reads 70°F (21°C)

6/16/97 JOY CTM-8 reads 70°F (21°C)

6/17/97 JOY/MO CTM-8 reads 70°F (21°C) All tests taken down. E. foetida from each replicate chamber were removed and observed. Test organisms were counted, cleaned and weighed for the replicates. Each replicate was put in a Ziploc® bag with a moist paper towel and left at room temperature to depurate. Portions of soil from each replicate were removed and pooled for each sample for pH measurement.

6/18/97 JOY/MO Removed worms from bags, cleaned worms and each replicate put in an 8oz amber glass jar. All jars were quickly frozen in the freezer at -20°C

[redacted]

Environm[illegible]al Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page:
ESE QA Form: 097A
Effective: August 1994

SUBJECT: TOXICITY TEST DATA SHEET

Client: ROY F. WESTON | Project Number: 3197225-0100

Test Material

See Page ______ of Sample Receipt Log
Test Material Information

Test Conditions

[ ] Preliminary
[X] Definitive
[ ] Screening

[X] Static [ ] Flow-through
Duration: 28 days

Test Animal History

Species : E. foetida
Batch Number : 97-34
Age / Life Stage : > 60 days old
Date Acclimation / Maintenance Began : 5/4/97
See Page 177 of Invertebrate Holding Log for raw data.
Mortality (%) 48 Hrs prior to testing: 0 %

Dilution Water: N/A

Lighting : [X] Fluorescent [ ] Incandescent
Photoperiod : 24 hr Light : — hr Dark

Test Container Dimensions (cm): 14 L x — W x 23.5 H
Test Solution Height : 21.5 cm
Test Containers : [ ] Open [X] Covered
Test Container Volume : ~4 Liters
Diluent Volume : ~3 Liters

Test Area Used	Temperature (C)	Salinity (ppt)
Diluter Room	20 +/- 2	NA +/-

Reps / Concentration : 3
Animals / Replicate : 10

Protocol Followed: EPA/600/3-88/029. (Greene et al)

Concentrations Based on: [ ] A.I. [X] W.M.

Container Composition: [X] Glass [ ] Plastic

Test Concentrations: (Units = %):	Control	All Samples*						
Amount Reference Soil Added ( ):	—	—	—	—	—	—	—	—
Amount Test Soil Added (g):	~~N/A~~ 1400	1400						

Additional Observations: *Sample IDS (13) control;

Data By: ________ Date: ________

FORM: Soil94

[redacted]

AR301094

Environmental Science & Engineering, Inc.
Toxicology Laboratory
Gainesville, Florida

ESE Project No: 3197225
ESE QA Form Number: 1123
Effective Date: January 1996

SUBJECT: TOXICITY DATA SHEET										SPECIES: *Eisenia Foetida*					
DAY		0	28	0	28	0		7		14		21		28	
DATE		5/20/97	6/17/97	5/20/97	6/17/97	5/20/97		5/27/97		6/3/97		6/10/97		6/17/97	
FEEDING		N	NA	N	N	N		N		21g Alfalfa		N		N	
TIME		1330	1345	1745	1400	1745		1430		1215		1215		1500	
DATA BY		JJY	JOY	JOY	JJY	JJY		MO/JOY		JOY		JOY/MO		JOY/MO	
SAMPLE ID	REP	pH (su) Initial	Final	WEIGHT (g) Initial	Final	No. Alive	OBS	No. Alive	OBS	No. Alive	OBS	No. Alive	OBS	No. Alive	OBS
CONTROL 1	A	4.0	7.00	28.38	39.3	70	N	70	N	70	N, Eggs	70	OR	69	1D, Y, Eggs
	B	↓	↓	25.83	34.9	70	N	70	N	70	N	70	OR	70	Y, Eggs
	C	↓	↓	26.11	37.9	70	N	70	N	70	N	70	OR	70	Y, Eggs
	D	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CONTROL 2	A	4.0	6.0	24.2	36.4	70	N	70	N	70	N	70	OR	70	Eggs, Y
	B	↓	↓	23.7	32.3	70	N	70	N	70	N	70	OR	70	Eggs, Y
	C	↓	↓	26.8	36.6	70	N	70	N	70	N	70	OR	70	Eggs, Y
	D	—	—	—	—	—	—	—	—	—	—	—	—	—	—
501	A	7.6	7.5	23.1	14.5	70	N	70	N	68	2D	68	N	~50	10D, LE, Y
	B	↓	↓	24.3	20.2	70	N	70	N	70	N	70	N	55	2D, Y, Eggs
	C	↓	↓	25.5	24.2	70	N	70	N	70	N	70	N	65	Y, Eggs, LE
	D	—	—	—	—	—	—	—	—	—	—	—	—	—	—
502	A	4.9	5.7	23.6	28.2	70	N	70	N	70	N	70	OR, Eggs	70	Y, Eggs
	B	↓	↓	23.25	26.1	70	N	70	N	70	N	70	OR Eggs	70	Y
	C	↓	↓	24.49	30.4	70	N	70	N	70	N	70	OR	70	Y
	D	—	—	—	—	—	—	—	—	—	—	—	—	—	—

KEY: OBS = OBSERVATION REP = REPLICATE A = ALIVE SW = SWELLING EL = ELONGATION HE = HEMORRHAGING
LE = LETHARGIC ALF = ALFALFA D = DEAD NF = NOT FOUND N = NONE SU = STANDARD UNITS
Y = YOUNG OR = OBSERVABLE REPRODUCTION

AR301095

Environmental Science & Engineering, Inc.
Toxicology Laboratory
Gainesville, Florida

ESE Project No: 397225
ESE QA Form Number: 1123
Effective Date: January 1996

SUBJECT: TOXICITY DATA SHEET

SPECIES: *Eisenia Foetida*

DAY		0	28	0	28	0		7		14		21		28	
DATE		5/20/97	6/17/97	5/20/97	6/17/97	5/20/97		5/27/97		6/3/97		6/10/97		6/17/97	
FEEDING		N	NA	N	N	N		N		2g Alf/rep		N		N	
TIME		1330	1345	1745	1400	1745		1430		1215		1215		1500	
DATA BY		JY	JY	JY	JY	JY		MO/JY		JY		MO/JY		MO/JY	
SAMPLE ID	REP	pH (su) Initial	pH (su) Final	WEIGHT (g) Initial	WEIGHT (g) Final	No. Alive	OBS	No. Alive	OBS	No. Alive	OBS	No. Alive	OBS	No. Alive	OBS
503	A	8.3	7.6	23.3	32.0	70	N	70	N	70	N	*~~OR~~ 70 Eggs	Eggs OR *~~70~~	70	Y
	B	↓	↓	27.5	25.7	70	N	70	N	70	N	*~~OR~~ 70	*~~70~~ OR	70	Y
	C	↓	↓	25.8	24.9	70	N	70	N	70	N	*~~OR~~ 70	*~~70~~ OR	70	Y
	D	—	—	—	—	—	—	—	—	—	—	—	—	—	—
504	A	4.7	7.5	27.5	24.5	70	N	70	N	70	N	70	N	70	Y
	B	↓	↓	27.0	25.8	70	N	70	N	70	N	70	N	70	Y
	C	↓	↓	22.0	22.6	70	N	70	N	70	N	70	N	70	Y
	D	—	—	—	—	—	—	—	—	—	—	—	—	—	—
505	A	7.0	7.2	24.3	37.0	70	N	70	N	70	N	70	OR	70	Eggs, Y
	B	↓	↓	23.6	32.9	70	N	70	N	70	N	70	OR	70	Eggs, Y
	C	↓	↓	24.4	33.6	70	N	70	N	70	N	70	OR	70	Y
	D	—	—	—	—	—	—	—	—	—	—	—	—	—	—
506	A	5.6	6.2	25.7	15.2	70	N	70	N	70	LE	70	LE	*~~70~~ 59	11 NF LE
	B	↓	↓	28.9	18.4	70	N	70	N	70	LE	70	N	64	6 NF LE
	C	↓	↓	27.0	25.3	70	N	70	N	70	LE	70	N	69	LE
	D	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* JY NP. 6/10/97

NF JY 6/17/97

KEY: OBS = OBSERVATION REP = REPLICATE A = ALIVE SW = SWELLING EL = ELONGATION HE = HEMORRHAGING
LE = LETHARGIC ALF = ALFALFA D = DEAD NF = NOT FOUND N = NONE SU = STANDARD UNITS

Y = YOUNG OR = OBSERVABLE REPRODUCTION

AR301096

Environmental Science & Engineering, Inc.
Toxicology Laboratory
Gainesville, Florida

ESE Project No: 397225
ESE QA Form No: 1125
Effective Date: January, 1996

WATER HOLDING CAPACITY DETERMINATION

DATE	5-20-97	5-20-97	5-20-97	5-20-97	5-20-97	
TIME	0830	0830	0850	1200	1200	
DATA BY	CR	CR	CR	CR	CR	
SAMPLE ID	DRY SAMPLE WT (10 g) [A]	VOL WATER ADDED (mL) [B]	WT (g) FILTER PAPER + FUNNEL [C]	FINAL WT (g) [D]	WHC* mL H_2O/100g JN	
501	10.0001	10	23.1331	41.0608	~~0.7999~~	7.93 79.3
502	10.0002	10	23.2492	39.5407	~~0.629~~	6.29 62.9
503	10.0001	10	23.2384	21.9882	-11.25	
504	10.0003	10	22.9583	40.2416	7.28	72.8
505	10.0002	10	23.1107	39.4310	6.32	63.2
506	10.0001	10	22.9469	42.5741	9.63	96.3
Control	10.0003	10	23.3421	38.0156	4.67	46.7

COMMENTS:

*Water Holding Capacity (WHC) = $\frac{\text{Final Weight - Initial Weight}}{\text{Dry Sample Weight}} = \frac{[D] - ([A] + \cancel{[B]}\,C)}{[A]} \times 10$

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Laboratory
Gainesville, Florida

ESE Project No: 3197225
ESE QA Form No: 1124
Effective Date: January, 1996

MOISTURE FRACTION DETERMINATION				
DATE	5-19-97	5-19-97	5-20-97	5-20-97
TIME	1000	1000	1200	1200
SAMPLES PLACED IN BLUE-M OVEN AT: 1000 Hrs		REMOVED AT: 1000 Hrs		
DATA BY	CR			
SAMPLE ID	PAN WEIGHT (g) [A]	PAN + SAMPLE WT (g) [B]	FINAL WEIGHT (g) [C]	MOISTURE FRACTION*
501	0.9189	20.9867	16.8087	0.2082
502	0.9272	20.6591	16.4117	0.2152
503	0.9264	24.4716	20.9281	0.1505
504	0.9258	26.7571	20.5809	0.2391
506	0.9313	20.1926	12.4137	0.4039
CONTROL(7)	0.9312	25.4031	20.6846	0.1519
505	0.9283	22.5997	17.9095	0.2164

COMMENTS:

$$^{*}\text{Moisture Fraction} = \frac{\text{Initial Weight - Final Weight}}{\text{Sample Weight}} = \frac{[B] - [C]}{[B] - [A]}$$

[redacted]

Appendix C: Reference Toxicant Test Raw Data

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Laboratory (Gainesville, FL)

ESE QA Form Number 1127
Effective: September, 1996

Eisenia foetida Reference Toxicant Test

Stock Preparation	Test Conditions
Amount of 2-chloroacetamide: 1 gram	Duration: 7 days static test
Volume of Milli-Q Water: 1 L	Lighting: Continuous fluorescent lighting
Date prepared: 5-22-97	Dilution material: Laboratory Prepared Artificial soil
Test Organism History	Test Container : Glass 1 pint jar (7.5 cm width, 15 cm height), covered with a lid containing two airholes
Batch number: 97-34	Amount of test material per replicate: 200 grams
Life stage: Sexually mature adults	Replicates per concentration: one
Date received: 5/14/97	Test organisms per replicate: ten
See Page 177 of the Invertebrate Holding Log for raw data	Protocol followed: SCP-A-004

Test Concentrations (mg/L)	Control	10	20	40	80	160
Amount of REF TOX (mL) added per 200 grams of soil	0	2	4	8	16	32

DATE	5-22-97	5-23-97	5-24-97	5-25-97	5-26-97
TIME	1500	1500	1315	1400	1330
TECH	CL	CL	MO	MO	MO
TEMP (°C)	20	20	20	20	20
DAY	0	1	2	3	4
CONCENTRATION (mg/L)	OBSERVATIONS				
CONTROL	10	10	10	10	10
10	10	10	10	10	10
20	10	10	10	10	10
40	10	10	10	6 Alive 4 Dead	4 Alive 2 Dead
80	10	9 DEAD 1 ALIVE	0 ALIVE 1 DEAD	—	
160	10	10 DEAD 0 ALIVE	—	—	

[redacted]

Environmental Science & Engineering, Inc.
Toxicology Laboratory (Gainesville, FL)

ESE QA Form Number 1127
Effective: September, 1996

Eisenia foetida Reference Toxicant Test

Stock Preparation	Test Conditions
Amount of 2-chloroacetamide:	Duration: 7 days static test
Volume of Milli-Q Water:	Lighting: Continuous fluorescent lighting
Date prepared:	Dilution material: Laboratory Prepared Artificial soil
Test Organism History	Test Container : Glass 1 pint jar (7.5 cm width, 15 cm height), covered with a lid containing two airholes
Batch number:	Amount of test material per replicate: 200 grams
Life stage: Sexually mature adults	Replicates per concentration: one
Date received:	Test organisms per replicate: ten
See Page _______ of the Invertebrate Holding Log for raw data	Protocol followed:

Test Concentrations (mg/L)	Control	10	20	40	80	160
Amount of REF TOX (mL) added per 200 grams of soil	0	2	4	8	16	32

DATE	5-27-97	5-28-97	5-29-97	
TIME	1400	1100	1000	
TECH	MO	MO	MO	
TEMP (°C)	20	20	20	
DAY	5	6	7	
CONCENTRATION (mg/L)	OBSERVATIONS			
CONTROL	10	10	10	
10	10	10	10	
20	10	10	10	
40	2 Alive, 2 Dead	0A, 2 Dead	—	
80	—	—	—	
160	—	—	—	

[redacted]

TRIMMED SPEARMAN-KARBER METHOD. VERSION 1.5

DATE: May 26, 1997 TEST NUMBER: 3 DURATION: 7 d
TOXICANT : 2-chloroacetamide
SPECIES: E. foetida

RAW DATA: Concentration (mg/L)	Number Exposed	Mortalities
.00	10	0
10.00	10	0
20.00	10	0
40.00	10	6
80.00	10	10
160.00	10	10

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: 37.32
95% LOWER CONFIDENCE: 30.11
95% UPPER CONFIDENCE: 46.26

[redacted]

AR301102

APPENDIX G
Histopathology Report
Avtex Fibers Site
Front Royal, VA
February 1999

215\del\fr\9902\fr2215.wpd

[redacted]

13862686

NAME/SPECIES: WESTON REAC, UNKNOWN
REQUESTING DR: 03347-142-001-2251-0
ANIMAL ID: ATTN: JOHN JOHNSTON
UNK

WESTON/REAC PROJECT
2890 WOODBRIDGE AVE #209
EDISON, NJ 08837-3679

ARP ID#: (06727)000-22-1
RECEIVED: 03JUL97
PRINTED: 17JUL97 0930
PAGE: 1

VETERINARY PATHOLOGY

CASE#: VR-97-001034

INFORMATION

Animal Reference Pathology
500 Chipeta Way
Salt Lake City, Utah 84108
800-426-2099

35 Liver + Kidney
Histopathology
Avtex
TL. M. Hkstru

RESEARCH

WESTON REAC STUDY #03347-142-001-2215-01
AVTEX FIBERS

VR-97-1034
SLIDE A- (201)
KIDNEY- This tissue is acutely congested with mild to moderate autolysis. The autolytic change has degenerated the epithelium of the tubules. Specific other change is not identified.

LIVER- The liver tissue is acutely congested with mild hepatocellular vacuolization. No evidence of specific inflammation or degeneration is identified.

SLIDE B- (202)
KIDNEY- This tissue is acutely congested with mild to moderate autolysis. No evidence of tubular degeneration except for autolysis is identified. Other significant degenerative change is not present.

LIVER- This tissue is moderately autolyzed with multifocal collections of eosinophils, lymphocytes, and plasma cells in the portal triad areas. Some of the hepatocytes are vacuolated. The autolytic change includes large numbers of saprophytic bacteria.

SLIDE C- (203)
KIDNEY- This section of kidney demonstrates mild autolysis with acute congestion. Foci of moderate autolysis are also identified. Other significant change is not identified.

SPLEEN- Splenic tissue is submitted in place of the liver. This spleen is acutely congested with focal areas of hemorrhage. The hemorrhage and splenic degeneration could be the result of stress or trauma from capture. Liver is not included in this collection.

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138626

NAME/SPECIES: WESTON REAC, UNKNOWN
REQUESTING DR: 03347-142-001-2251-0
ANIMAL ID: ATTN: JOHN JOHNSTON
UNK

WESTON/REAC PROJECT
2890 WOODBRIDGE AVE #209
EDISON, NJ 08837-3679

ARP ID#: (06727)000-
RECEIVED: 03
PRINTED: 17 09
PAGE: 2

VETERINARY PATHOLOGY

CASE#: VR-97-001034

RESEARCH

SLIDE D- (205)
KIDNEY- This tissue is acutely congested with mild autolysis and no specific degeneration. There are focal collections of lymphoid cells in the pelvic tissue. Significant other change is not identified in the kidney.

LIVER- The liver tissue is acutely congested with multifocal collections of lymphocytes, plasma cells and eosinophils in the portal triad areas. Mild hepatocellular vacuolization has occurred throughout the liver parenchyma. With the eosinophils present, we are concerned about a parasitic invasion along the portal triad areas, or possible ascending bacterial infection. Specific other changes or primary toxic disease is not identified.

SLIDE E- (206)
KIDNEY- The renal tissue is acutely congested and well preserved. No evidence of specific inflammation or degeneration is identified in this renal parenchyma.

LIVER- This tissue is acutely congested with no evidence of primary hepatic disease.

SLIDE F- (207)
KIDNEY- This section of kidney is acutely congested with well preserved tissue. No significant lesions are identified.

LIVER- This tissue is acutely congested with no evidence of specific inflammation or primary disease.

SLIDE G- (208)
KIDNEY- The renal tissue is acutely congested with no evidence of specific inflammation or degeneration. The tissue appears to be well preserved.

LIVER- This tissue is acutely congested with very mild autolysis particularly where the gall bladder has had contact with the liver surface. There are multifocal collections of lymphocytes, eosinophils, and plasma cells in the portal triad areas of the hepatic tissue. Specific inflammation, degenerative change, or toxicity is not otherwise identified.

SLIDE H- (209)
KIDNEY- This tissue is acutely congested with mild autolysis and no evidence

Continued on Next Page...

[redacted]

VETERINARY PATHOLOGY

CASE#: VR-97-001034

RESEARCH

of specific infection.

LIVER- The liver tissue is acutely congested with multifocal areas of autolysis. The portal triad areas include a few collections of lymphocytes and plasma cells. Some hepatocytes are vacuolated. There is a slight variation in hepatocellular size. This may be a complication of autolysis or other nonspecific change.

SLIDE I- (210)
KIDNEY- This tissue is acutely congested with very mild autolysis and no evidence of specific inflammation.

LIVER- The liver tissue is acutely congested with a few collections of lymphocytes and plasma cells in portal triad areas. There is a slight variation in hepatocellular size in this liver tissue. Other significant changes are not present.

SLIDE J- (211)
KIDNEY- The renal tissue is acutely congested with no evidence of significant inflammation or change.

LIVER- The liver tissue is acutely congested with hepatocellular vacuolization and no significant other degenerative change.

SLIDE K- (212)
KIDNEY- This tissue is acutely congested and well preserved. Many of the glomeruli appear to be immature, suggesting a very young animal. No significant lesions are observed.

LIVER- This tissue is acutely congested with normal hepatocellular structure and no evidence of specific degeneration except for mild autolysis.

SLIDE L- (214)
KIDNEY- There is some amorphous eosinophilic material in the glomerular tufts lining the glomerular basement membranes. Specific inflammation is not identified in the kidney. This amorphous material has the appearance of amyloid.

LIVER- This tissue is acutely congested with mild to moderate autolysis. There are multifocal collections of amorphous eosinophilic material in the

Continued on Next Page...

[redacted]

VETERINARY PATHOLOGY

CASE#: VR-97-001034

RESEARCH

liver tissue. Eosinophils and other polymorphonuclear cells are scattered throughout this amorphous eosinophilic material. This material is classic for amyloid, and is present in multifocal sites throughout the liver parenchyma, but in some sections of liver, demonstrate extensive deposition.

SLIDE M- (215)
KIDNEY- The renal tissue is acutely congested with mild autolysis. Significant inflammation or degeneration is not identified.

LIVER- This tissue is acutely congested with collections of eosinophils, lymphocytes, and plasma cells in the portal triad areas. Mild autolysis has occurred in the liver parenchyma. Significant other change is not identified.

SLIDE N- (216)
KIDNEY- The renal tissue is acutely congested with no significant lesions.

LIVER- The liver tissue is acutely congested with mild autolysis and multifocal collections of neutrophils, lymphocytes, and plasma cells. Other portal triads have eosinophils collecting around biliary and portal elements. The inflammatory process is chronic and irregular including lymphocytes, plasma cells, and the eosinophils described previously.

SLIDE O- (217)
KIDNEY- This tissue is acutely congested with no evidence of autolysis or specific inflammation.

LIVER- The liver tissue is acutely congested with mild hepatocytic vacuolization. There are a few collections of polymorphonuclear cells in the sinusoids of the hepatic tissue. These collections are irregular and small.

SLIDE P- (218)
KIDNEY- This tissue is acutely congested. There is no evidence of specific inflammation or change in the tissue, and the tissue is well preserved.

LIVER- This tissue is acutely congested with mild hepatocytic vacuolization and granularity of the hepatocytes. Other significant inflammation or change is not identified.

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[redacted]

NAME/SPECIES: WESTON REAC, UNKNOWN
UESTING DR: 03347-142-001-2251-0
AL ID: ATTN: JOHN JOHNSTON
UNK

WESTON/REAC PROJECT
2890 WOODBRIDGE AVE #209
EDISON, NJ 08837-3679

ARP ID#: (06727)000-22-1
RECEIVED: 03JUL97
PRINTED: 17JUL97 0930

VETERINARY PATHOLOGY

CASE#: VR-97-001034

RESEARCH

SLIDE Q- (219)
KIDNEY- This tissue is acutely congested with well preserved renal parenchyma. Inflammation or significant degeneration is not identified.

LIVER- The liver tissue is acutely congested with granularity. Other significant change or inflammation is not identified. Infection is not present, nor could we identify evidence of specific toxicity.

SLIDE R- (220)
KIDNEY- The renal tissue is acutely congested with mild autolysis. Significant other degenerative change or inflammation is not identified. Infection is not identified in the renal tissue.

LIVER- The liver tissue is acutely congested with a few collections of lymphocytes and plasma cells in the portal triad areas. Some eosinophils are part of the collection. Limiting plates are altered by the increased cellularity in the portal triad areas. The inflammatory process is minimal.

SLIDE S- (221)
KIDNEY- This tissue is acutely and moderately congested. Many of the glomeruli are immature. The glomerular tufts support a limited cellularity.

LIVER- The liver tissue is acutely congested and moderately autolyzed. Specific inflammation or change is not identified in the liver parenchyma. Infection or toxicity is not identified.

SLIDE T- (222)
KIDNEY- The renal tissue is acutely congested with mild autolysis. The glomerular tufts are immature, suggesting an immature animal. Inflammation or degeneration is not identified.

LIVER- The liver tissue is mildly autolyzed with acute congestion. Specific inflammation or infection or alteration of the liver parenchyma is not identified.

SLIDE U- (223)
KIDNEY- This tissue is acutely congested with immature glomeruli. The tissue is well preserved with no evidence of specific significant change.

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[redacted]

13862686

NAME/SPECIES: WESTON REAC, UNKNOWN
REQUESTING DR: 03347-142-001-2251-0
ANIMAL ID: ATTN: JOHN JOHNSTON
UNK

WESTON/REAC PROJECT
2890 WOODBRIDGE AVE #209
EDISON, NJ 08837-3679

ARP ID#: (06727)000-2
RECEIVED: 03JUL
PRINTED: 17J 93
PAGE:

VETERINARY PATHOLOGY

CASE#: VR-97-001034

RESEARCH

LIVER- This tissue is acutely congested with no significant inflammation through much of the tissue. There are a few collections of lymphocytes and plasma cells in focal sites of the portal triad area. Significant other primary liver disease is not identified. Acute congestion is a prominent part of the reaction.

SLIDE V- (224)
KIDNEY- The renal tissue is acutely congested with well preserved tissue. Many of the glomerular tufts demonstrate an immature appearance. Specific inflammation or toxicity is not identified.

LIVER- The liver tissue is acutely congested with good preservation and mild granularity of hepatocytes. No other significant change or inflammation is identified.

SLIDE W- (225)
KIDNEY- This section of renal tissue is acutely congested and has an immature appearance. Some tubules are vacuolated, but this could be due to immaturity or due to nonspecific change. Inflammation or infection is not identified.

LIVER- The liver tissue is acutely congested with mild autolysis. No other specific inflammation or change is identified.

SLIDE X- (226)
KIDNEY- This renal tissue is immature with acute congestion and no significant lesions.

LIVER- There is acute mild congestion with mild hepatocellular granularity and well preserved liver tissue. No significant lesions are present.

SLIDE Y- (227)
KIDNEY- This tissue is acutely congested with no evidence of significant inflammation or change.

LIVER- The liver tissue is acutely congested with mild hepatocellular granularity. Inflammation is minimal.

SLIDE Z- (228)
KIDNEY- This tissue is acutely congested. No significant inflammation or change is identified in the renal parenchyma.

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[redacted]

AME/SPECIES: WESTON REAC, UNKNOWN
UESTING DR: 03347-142-001-2251-0
MAL ID: ATTN: JOHN JOHNSTON
JNK

WESTON/REAC PROJECT
2890 WOODBRIDGE AVE #209
EDISON, NJ 08837-3679

ARP ID#: (06727)000-22-1
RECEIVED: 03JUL97
PRINTED: 17JUL97 0930

VETERINARY PATHOLOGY

CASE#: VR-97-001034

RESEARCH

LIVER- This tissue is acutely congested with a few collections of lymphocytes and plasma cells in portal triad foci. Very mild subcapsular autolysis has occurred in focal sites. Specific inflammation or infection is not identified.

SLIDE AA- (229)
KIDNEY- This tissue is acutely congested and well preserved. No other significant change or inflammation is identified.

LIVER- This tissue is acutely congested with multifocal areas of autolysis and some variation in hepatocellular size and shape. Specific inflammation or other toxic change is not identified.

SLIDE AB- (230)
KIDNEY- This tissue is acutely congested, demonstrating immature glomeruli, and is well preserved. No significant changes are present.

LIVER- This tissue is acutely congested with mild autolysis and intestinal bacteria over the capsular surface. Significant hepatocellular degeneration is not identified.

SLIDE AC- (231)
KIDNEY- This tissue is acutely congested with no significant inflammation or change.

LIVER- This tissue is acutely congested with no significant lesions.

SLIDE AD- (232)
KIDNEY- This tissue demonstrates acute congestion with very mild autolysis and no significant lesions.

LIVER- This tissue is acutely congested with multifocal collections of lymphocytes, plasma cells and rare eosinophils. The hepatocellular elements demonstrate no significant changes.

SLIDE AE- (233)
KIDNEY- This tissue is acutely congested with immature glomeruli and no evidence of significant renal disease.

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13862686

NAME/SPECIES: WESTON REAC, UNKNOWN
REQUESTING DR: 03347-142-001-2251-0
ANIMAL ID: ATTN: JOHN JOHNSTON
UNK

WESTON/REAC PROJECT
2890 WOODBRIDGE AVE #209
EDISON, NJ 08837-3679

ARP ID#: (06727)000-2
RECEIVED: 03JUL97
PRINTED: 17J 930
PAGE:

VETERINARY PATHOLOGY

CASE#: VR-97-001034

RESEARCH

LIVER- The liver tissue is acutely congested with multifocal areas of hemorrhage and hepatocellular vacuolization. There are collections of lymphocytes and plasma cells in portal triad areas. These inflammatory elements are collecting irregularly. Degeneration of surrounding hepatocytes suggests an inflammatory process and possible septic process in this liver tissue, particularly since there is hepatocellular necrosis adjacent to these inflammatory cell infiltrates. This reaction is multifocal throughout the liver parenchyma. Necrotic cells are present in several sites.

SLIDE AF- (234)
KIDNEY- This tissue is acutely congested with mild autolysis. Significant renal disease is not identified.

LIVER- This tissue is acutely congested with mild hepatocellular autolysis. There are multifocal collections of lymphocytes and plasma cells in the portal triad areas. Specific inflammation or change is not otherwise identified.

SLIDE AG- (235)
KIDNEY- This tissue is acutely congested with mild autolysis. There are multifocal sites of acute hemorrhage which very likely is the result of the collection procedure. No other significant change is identified.

LIVER- This tissue is acutely congested with no significant hepatocellular degeneration.

SLIDE AH- (236)
KIDNEY- The renal tissue is acutely congested. There are no other significant changes in the renal tissue.

LIVER- This tissue is acutely congested with no significant lesions.

SLIDE AI- (237)
KIDNEY- The renal tissue is acutely congested with no specific inflammation or change.

LIVER- The liver tissue demonstrates a diffuse infiltration of neutrophils, lymphocytes, and plasma cells in the portal triad areas. There is evidence of biliary hyperplasia and fibrosis. The reaction appears to be chronic, and supports a chronic bacterial infection ascending up the biliary tree.

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[redacted]

NAME/SPECIES: WESTON REAC, UNKNOWN
QUESTING DR: 03347-142-001-2251-0
MAL ID: ATTN: JOHN JOHNSTON
UNK

WESTON/REAC PROJECT
2890 WOODBRIDGE AVE #209
EDISON, NJ 08837-3679

ARP ID#: (06727)000-22-1
RECEIVED: 03JUL97
PRINTED: 17JUL97 0930

VETERINARY PATHOLOGY

CASE#: VR-97-001034

RESEARCH

COMMENTS

There are variable changes in the tissues in this particular collection. Many of the animals demonstrate infection that appears to be ascending up the biliary tree. The more chronic long term lesions appeared in animal AI/237. There was an active infectious and inflammatory process in animal AE/233. This inflammatory process supported active inflammation at the time this tissue was collected. Many of the other animals demonstrated focal areas of inflammation and a suggestion of parasitic migration. One animal (Slide L/214) had amyloidosis in the liver and renal glomeruli. This observation suggests a bacterial infection or chronic inflammation in other sites, resulting in some type of atypical antigen/antibody response in that individual.

Specific toxic, neoplastic or primary degenerative changes was not identified in these tissues. The tissues were well preserved. There appeared to be many immature animals represented in this collection.

07/16/97
(LDM/mdp) Verified by: L. D. McGill, D.V.M., Ph.D., DACVP
Veterinary Pathologist
electronic signature

For Histopathology Consultation Call: 1-800-426-2099

[redacted]

(908) 321-4200
EPA Contra[redacted]-C4-0022

Project Name: ANTEX FIBERS, VA
Project Number: 03[redacted]142·001·2215·01
RFW Contact: JOHN [redacted]OHNSON Phone: 908·321·4200

No: [redacted]356

SHEET NO. 1 OF 3 MA

Sample Identification | **Analyses Requested**

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	HISTO.			
11-215	00201	TP-6-9	X	5/13/97	1	40mL / formalin	X			
	00202	REF.-5-19								
	00203	REF.-2-11								
	00205	TP-3-19								
	00206	FA-10-8		5/14/97						
	00207	FA-10-10								
	00208	WA-A-50								
	00209	REF.-6-1								
	00210	REF.-6-7								
	00211	REF.-5-18								
	00212	REF.-2-10								
	00214	REF.-1-17								
	00215	REF.-4-17								
	00216	REF.-5-9								
	00217	FA-10-8								
	00218	FA-10-9								
	00219	FA-10-8		5/15/97						
	00220	REF.-1-8								
	00221	REF.-1-17								
	00222	FA-11-21								

Matrix:
SD - Sediment PW - Potable Water S - Soil
DS - Drum Solids GW - Groundwater W - Water
DL - Drum Liquids SW - Surface Water O - Oil
X - Other SL - Sludge A - Air

Special Instructions:
X = TISSUE (LIVER, KIDNEY)

FOR SUBCONTRACTING USE ONLY

FROM CHAIN OF CUSTODY #

NOTE: NO SAMPLE 00204 OR 00213

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyses	Mark Huston	6/25/97									

FORM #4 8/94

REAC, Edison, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: ANTEX FIBERS, VA
Project Number: 03347-142-001-8215.01
RFW Contact: JOHN JOHNSON Phone: 908-321-4200

No: 05357

SHEET NO. 2 OF 2

Sample Identification / Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	HISTO.			
11-215	00223	FA-10-9	X	5/15/97	1	40mL / formalin	X			
	00224	REF.-5-20								
	00225	REF.-5-19								
	00226	REF.-2-12								
	00227	FA-10-10								
	00228	FA-11-2								
	00229	REF.-6-10								
	00230	FA-10-18								
	00231	TP-1-2								
	00232	TP-1-1								
	00233	TP-2-2								
	00234	REF-6-9								
	00235	WA-NORTH-20								
	00236	WA-SOUTH-17								
	00237	TP-4A-8		5/16/97						

Matrix:
SD - Sediment PW - Potable Water S - Soil
DS - Drum Solids GW - Groundwater W - Water
DL - Drum Liquids SW - Surface Water O - Oil
X - Other SL - Sludge A - Air

Special Instructions:
X = TISSUE (LIVER, KIDNEY)

FOR SUBCONTRACTING USE ONLY

FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
all analyzed	N. Hamilton	6/25/97	[illegible]	6-27-97	1600						

FORM #4

8/94

APPENDIX H
Benthic Macroinvertebrate Report
Avtex Fibers Site
Front Royal, VA
February 1999

215\del\fr\9902\fr2215.wpd

RECEIVED
SEP 10 1997
WESTON/REAC

Symbiosis Environmental
5255 Route 212
Riegelsville, PA 18077
(610)-749-2080

September 10, 1997

Mr. Mark Huston
Roy F. Weston - REAC
GSA Raritan Depot
2890 Woodbridge Avenue
Edison, NJ 08837

Re: Avtex Fibers

Dear Mr. ~~Huston~~ Mark:

I have completed the taxonomic analysis of the 21 samples shipped to me last month. Enclosed is a single copy of the report and a diskette containing the report and the spreadsheet. I have also sent this by e-mail as you requested.

An invoice is included.

Thank you for your business. If you have any questions, please do not hesitate to call. If you have an emergency, you may call me in Trenton at (609) 984-6694. Otherwise, I will return your call within 24 hours.

Sincerely,

W. Scott Douglas

W. Scott Douglas
Principal

Ecotoxicology • Bioassessment • Data Analysis

[redacted]

FINAL REPORT

BIOASSESSMENT
OF
AVTEX FIBERS

September 10, 1997

SUBMITTED TO:

Roy F. Weston - REAC
2890 Woodbridge Avenue
Edison, NJ 08837

SUBMITTED BY:

W. Scott Douglas
Symbiosis Environmental
5255 Route 212
Riegelsville, PA 18077
(610) 749-2080

[redacted]

PROJECT SUMMARY

Twenty one samples of benthic invertebrate fauna were collected at the Avtex Fibers site in Virginia on May 13, 1997 by Weston REAC personnel. The samples were sorted to remove detritus by Weston personnel and shipped to Symbiosis Environmental on August 13, 1997. Samples were received in glass vials with isopropyl alcohol and were in good condition on receipt.

Each sample was identified to lowest practical taxon, genus in most cases using commonly accepted taxonomic references (Peckarsky et al. 1990, Wiggins 1996, and Merrit and Cummins 1996). Chironomid larvae were counted but not identified to genus. Molluscs were identified to family level in most cases. Exuviae, empty shells, and pieces of larvae without heads were not included in counts. Identified organisms were returned to vials (by order in most cases) and preserved with isopropyl alcohol. All vials will be returned to Weston-REAC for archiving.

The organism identification and enumeration was performed for each sample and recorded on a spreadsheet. Standard metrics; H'diversity, taxa richness, ept index, ept:chironomid ratio, % contribution dominant taxon; modified Hilsenhoff biotic index, and scraper:filterer ratio, were calculated on each sample. In addition, an average of the three replicate samples for each of the six stations and the reference were also calculated. These averages were used to calculate a Biological Condition Score following EPA procedures for Rapid Bioassessment (EPA, 1989). The scores were used to compare each of the six stations to the reference for determination of potential impact. Five of the six stations were found to be not impaired compared to the reference. Station 3 is slightly impaired compared to the reference. This conclusion is based on reduced Hilsenhoff Biotic Index, low EPT:Chironomid ratios, and a relatively high community loss index in the Station 3 samples when compared to the reference. Station 3 also had the lowest H' diversity (not used in Biological Condition Score).

Complete details of the study are included in the following report.

Report Certified by: W. Scott Douglas — 9/10/97

W. Scott Douglas
Principal

Date

[redacted]

PROJECT REPORT
TAXONOMIC IDENTIFICATION OF BENTHIC INVERTEBRATES

I. OBJECTIVE

The objective of this study was to isolate and identify to lowest practical taxon the organisms in samples of benthic substrate. An additional objective was to perform a bioassessment comparing the six test stations to a reference station.

II. SAMPLE INFORMATION

Location: Avtex Fibers, VA

Samples: Client ID
Ref A
Ref B
Ref C
1A
2A
3A
2A
2B
2C
3A
3B
3C
4A
4B
4C
5A
5B
5C
6A
6B
6C

Dates received: August 13, 1997

[redacted]

III. METHODOLOGY

A. Sample Collection

Samples were collected by Weston REAC personnel.

B. Sample Preparation

Samples were prepared by Weston REAC personnel.

C. Taxonomy

Organisms were sorted by taxon and representatives keyed to the lowest practical taxon (usually genus) using one or more of the following keys:

> Merritt, R.W., and K.W. Cummins, 1996. *An Introduction to the Aquatic Insects of North America, 3rd ed.*, Kendall Hunt Publishing Company, Dubuque, Iowa.
>
> Peckarsky, B. L, P.R. Fraissinet, M.A. Penton, and D.J. Conklin, Jr., 1990. *Freshwater Macroinvertebrates of Northeastern North America.* Cornell University Press, Ithaca, NY.
>
> Wiggins, G. B., 1996. *Larvae of the North American Caddisfly Genera (Trichoptera), 2nd ed.*, University of Toronto Press, Toronto, Canada.

The number of each taxa found in each sample was noted on a bench sheet.

C. Sample Storage

All organisms were stored in separately labeled vials filled with isopropyl alcohol. The samples will be returned to Weston REAC at the earliest convenience.

D. Data Analysis

The total number of organisms present and the number of distinct taxa identified are presented. The functional group of each taxa was determined by using the tables in Merritt and Cummins, 1996. The number of scrapers and filterers were determined and used to evaluate the scraper:filterer ratio. Species diversity in each sample was evaluated using Shannon's H'. The number of organisms in the orders Plecoptera, Ephemeroptera, and Trichoptera were determined and compared to the numbers of organisms in the family Chironomidae to evaluate the EPT:Chironomid ratio. The percent contribution of the dominant taxon was calculated by dividing the number of organisms in the most abundant taxon by the total number of organisms collected. All calculations were performed using

[redacted]

Microsoft Excel. Hilsenhoff's biotic index was conducted using the modifications suggested by the USEPA's Rapid Bioassessment Protocol (EPA 444/4-89/001).

In order to determine the biological condition at each station, the metrics were averaged across the three replicates (or recalculated, depending on the metric) and the result tabulated for each of the six stations and the reference. The condition score at each station was then compared to the score at the reference and evaluated using the criteria in EPA, 1989.

E. Quality Assurance

All samples are clearly marked with a sample number on arrival at Symbiosis. In this case the client ID served as the sample number. This number served as a tracking number for the sample throughout the processing. Taxonomic and enumeration data for each sample was recorded on a separate bench sheet on which the client ID was clearly marked. Each vial for organism storage was also clearly marked with the client ID. Data was transferred from the raw data sheets into a Microsoft Excel spreadsheet. Data entry was carefully cross-checked to guard against transcription errors. The spreadsheets were verified by hand calculations.

IV. RESULTS

The organisms in each sample were removed from the substrate, identified to lowest practical taxon and enumerated. These data are provided in Table 1. Total numbers of organisms collected ranged from 236 to 1243. The total number of distinct taxa identified (taxa richness) ranged from 15 to 29, with the lowest richness found at Station 3 and the highest at Station 1. Standardized community metrics were calculated for each sample and are provided in Table 2.

The metrics were then averaged across replicates or recalculated as appropriate to determine the community metrics for each of the stations. These data are presented in Table 3. There are no obvious upstream/downstream trends in the data. Stations 1,2,4,5 and 6 were considered not impaired compared to the reference. Station 3 can be considered slightly impaired compared to the reference. This appears to be due to a reduction in Biotic Index, a decreased EPT:chironomid ratio, and a reduced EPT index. The H'diversity was also lower at Station 3 than any of the other stations. Because the condition index was only slightly depressed relative to the reference, care should be exercised to consult additional available data on water and sediment quality, stream flow and depth, and habitat quality before further interpretations are made regarding these data.

[redacted]

V. SOURCE OF DOCUMENTATION

All original documentation will be stored for a maximum of 5 years at:

Symbiosis Environmental
5255 Route 212
Riegelsville, PA 18077

After this time, original documentation may be returned or destroyed at the client's request.

Table 1. Taxonomic Enumeration

Symbiosis Environmental
Bioassessment Report

Client Roy F Weston REAC
Date May 1997

Location Avtex Fibers VA

Taxon Class	Order	Family	Genus	Functional Group	Hilsenhoff Rating	Sample ID REF A	REF B	REF C	1A	1B	1C	2A	2B	2C
Oligochaeta				Deposit Feeder	8	4	1			2		1	1	
Crustacea	Amphipoda	Gammaridae	*Gammarus*	Shredder	4									
	Isopoda	Asellidae	*Caecidotea*	Shredder	8									1
Mollusca														
	Bivalvia	Sphaeriidae	*Pisidium*	Filterer	8	2		1						
		Corbiculidae	*Corbicula*	Filterer	8		1			3	9	2	1	2
	Gastropoda													
		Physidae		Scraper	8					2	5			
		Lymnaeidae		Scraper	6									
		Ancylidae		Scraper	6					1				
Insecta	Ephemeroptera	Heptageniidae	*Stenonema*	Scraper	4	10	10	11	13	12	21	5	2	6
		Isonychiidae	*Isonychia*	Filterer	2	10	10	11	5	5	8	2	3	3
		Baetidae	*Acentrella*	Gatherer	4	15	5	14	15	22	43	1	1	8
			Baetis	Scraper	4	123	68	86	41	25	46	73	38	104
		Leptophlebiidae		Shredder	2	2								
		Ephemerellidae	*Ephemerella*	Scraper	1	1		5	4	4	12	1	8	7
			Drunella	Scraper	0	14	2	3	5	6	5	2	4	15
			Serratella	Gatherer	2	49	29	22	19	35	105	3	6	43
		Potamanthidae	*Potamanthus*	Filterer	4	30	7	6	31	30	38	24	12	47
		Caenidae	*Caenis*	Scraper	7						1			
	Plecoptera	Perlodidae	*Isoperla*	Predator	2	1			1					
		Perlidae	*Agnetina*	Predator	2	5	4	6	4			4	2	3
			Perlesta	Predator	5	17	33	17	16	34	77	9	12	71
			Eccoptura	Predator	1	1		1						
		Pteronarcyidae	*Pteronarcys*	Shredder	0		3	1	2	1	1	1	1	2
	Trichoptera	Hydropsychidae	*Hydropsyche*	Filterer	4	11	4	2	6	13	23	1	4	10
			Cheumatopsyche	Filterer	4		1		2	4	5			2
		Uenoidae	*Neophylax*	Scraper	0									1
		Lepidostomatidae	*Lepidostoma*	Shredder	1				1		2			
		Hydroptilidae	*Hydroptila*	Scraper	6	1				1				
		Phryganeidae	*Phryganea*	Shredder	8	3	1			14	75			
		Leptoceridae	*Setodes*	Gatherer	4					2		1		
			Nectopsyche	Shredder	3					1	2			
			Oecetis	Predator	8									
	Diptera	Empididae	*Hemerodromia*	Predator	6				2		1	1	4	
		Chironomidae		Scraper	6	181	100	205	258	421	719	98	218	12
		Simuliidae	*Simulium*	Filterer	6		1	1						
		Ceratopogonidae	*Sphaeromias*	Predator	6					1				
			Probezzia	Predator	6									
	Coleoptera	Elmidae	*Stenelmis*	Scraper	5	19	14	13	15	25	42	4	5	5
			Optioservus	Scraper	4				1		1	3	1	1
			Microcylloepus	Scraper	3					3	2			
			Macronychus	Scraper	4					1				
			Dubiraphia	Scraper	6					1				
		Psephenidae	*Psephenus*	Scraper	4									
		Hydrophilidae	*Berosus*	Predator	0					1				
	Odonata	Gomphidae	*Stylogomphus*	Predator	0				1		2			
			Gomphus	Predator	5					1				1
			Ophiogomphus	Predator	1									1
		Coenagrionidae	*Argia*	Predator	2	1								
		Macromiidae	*Macromia*	Predator	7									1
	Lepidoptera			Shredder	5									
	Megaloptera	Corydalidae	*Corydalus*	Predator	5			1		1			1	
			Nechermes	Predator	0									

Table 1. Taxonomic Enumeration

Symbiosis Environmental
Bioassessment Report

Client: Roy F. Weston - REAC
Date: May, 1997

Location: Avtex Fibers, VA

Taxon				Functional Group	Hilsenhoff Rating	Sample ID											
Class	Order	Family	Genus			3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Oligochaeta				Deposit Feeder	8						8	6	6	1	1	4	
Crustacea	Amphipoda	Gammaridae	*Gammarus*	Shredder	4												
	Isopoda	Asellidae	*Caecidotea*	Shredder	8												
Mollusca																	
	Bivalvia	Spaeriidae	*Pisidium*	Filterer	8	1											
		Corbiculidae	*Corbicula*	Filterer	8					1	1		2	4		2	1
	Gastropoda																
		Physidae		Scraper	6	1					2	3	3	2		2	7
		Lymnaeidae		Scraper	6											1	
		Ancylidae		Scraper	6												
Insecta	Ephemeroptera	Heptageniidae	*Stenonema*	Scraper	4	2	13	23	9	5	22	47	50	35	29	51	26
		Isonychiidae	*Isonychia*	Filterer	2	1	1	3	15	23	9	11	10	6	28	11	3
		Baetidae	*Acentrella*	Gatherer	4		5	1	3	3	6	4	15	10	7	9	31
			Baetis	Scraper	4	37	48	8	32	8	13	64	66	75	67	37	47
		Leptophlebiidae		Shredder	2												
		Ephemerellidae	*Ephemerella*	Scraper	1	2	2		7	5	16	2	1	1	1	4	7
			Drunella	Scraper	0	1	1	3	3	7	1	1	1		5	2	9
			Serratella	Gatherer	2		25	9	25	21	41	12	14	13	25	39	37
		Potamanthidae	*Potamanthus*	Filterer	4	5	13	41	10	21	63	17	17	38	26	48	33
		Caenidae	*Caenis*	Scraper	7							1	1			1	
	Plecoptera	Perlodidae	*Isoperla*	Predator	2					1							
		Perlidae	*Agnetina*	Predator	2	2			2	6	7				7	3	6
			Perlesta	Predator	5	11	17	23	34	54	104	17	10	19	32	28	34
			Eccoptura	Predator	1								1				
		Pteronarcyidae	*Pteronarcys*	Shredder	0	1				1	3			1		3	1
	Trichoptera	Hydropsychidae	*Hydropsyche*	Filterer	4	1	2	8	3	11	19	3	2		3	7	9
			Cheumatopsyche	Filterer	4			1		1	1						1
		Uenoidae	*Neophylax*	Scraper	0						1						
		Lepidostomatidae	*Lepidostoma*	Shredder	1	2										1	
		Hydroptilidae	*Hydroptila*	Scraper	6												
		Phryganeidae	*Phryganea*	Shredder	8	49	85	16	10	8	25	12	71	17	19	75	105
		Leptoceridae	*Setodes*	Gatherer	4		1									1	
			Nectopsyche	Shredder	3							1			1		1
			Oecetis	Predator	8			2									
	Diptera	Empididae	*Hemerodromia*	Predator	6		1		2				1				
		Chironomidae		Scraper	6	368	232	327	166	84	388	199	302	381	160	389	610
		Simuliidae	*Simulium*	Filterer	6				3			2	2	1			
		Ceratopogonidae	*Sphaeromias*	Predator	6												
			Probezzia	Predator	6			1									
	Coleoptera	Elmidae	*Stenelmis*	Scraper	5	3	4	1	24	12	64	31	25	9	9	22	18
			Optioservus	Scraper	4				3	1	1						2
			Microcylloepus	Scraper	3												
			Macronychus	Scraper	4												
			Dubiraphia	Scraper	6			1			1		1				
		Psephenidae	*Psephenus*	Scraper	4							2					
		Hydrophilidae	*Berosus*	Predator	0				1				1				
	Odonata	Gomphidae	*Stylogomphus*	Predator	0												
			Gomphus	Predator	5					2		3	1				
			Ophiogomphus	Predator	1												
		Macromiidae	*Macromia*	Predator	2												
		Coenagrionidae	*Argia*	Predator	7												
	Lepidoptera			Shredder	5							1	2				
	Megaloptera	Corydalidae	*Corydalus*	Predator	6						2						1
			Neohermes	Predator	0							1					

Table 2. Community Metrics by Sample

Symbiosis Environmental
Bioassessment Report

Client Roy F Weston REAC
Date May 1997

Location Avtex Fibers VA

Metric	SAMPLE ID REF A	REF B	REF C	1A	1B	1C	2A	2B	2C
Total Number of Organisms	500	294	408	440	672	1243	236	322	348
Number of Taxa	21	18	18	20	29	24	19	19	22
Functional Feeding Groups									
Scrapers	348	194	323	335	502	854	186	274	153
Filterers	53	24	21	44	55	81	29	20	64
Shredders (CPOM only)									
Scrapers Filterers	8.58	8.08	15.38	7.61	9.13	10.54	8.41	13.70	2.39
Shredders/Total (CPOM only)									
EPT Abundance	293	177	185	165	209	462	127	91	324
Chironomid Abundance	161	100	205	258	421	719	98	218	12
EPT Chironomid	1.82	1.77	0.90	0.64	0.50	0.64	1.30	0.42	27.00
% Contribution Dominant Family	38.20	34.01	50.49	58.18	62.65	57.64	41.53	67.70	29.89
EPT Index	16	13	13	15	18	16	13	12	14
H' Diversity	2.02	2.01	1.70	1.69	1.66	1.71	1.70	1.38	2.15
Hilsenhoff's Biotic Index	4.5	4.5	4.8	5.0	5.3	5.3	4.8	5.3	3.8

Metric	SAMPLE ID 3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C
Total Number of Organisms	487	450	468	352	275	798	440	807	591	440	740	987
Number of Taxa	16	15	16	18	20	23	22	24	16	16	22	21
Functional Feeding Groups												
Scrapers	414	300	363	244	122	509	350	452	483	291	509	724
Filterers	8	16	53	31	57	93	33	33	47	57	68	47
Shredders (CPOM only)												
Scrapers Filterers	51.75	18.75	6.85	7.87	2.14	5.47	10.61	13.70	10.28	5.11	7.49	15.40
Shredders/Total (CPOM only)												
EPT Abundance	114	213	138	153	175	331	192	261	213	270	320	350
Chironomid Abundance	368	232	327	166	84	388	199	302	361	160	388	610
EPT Chironomid	0.31	0.92	0.42	0.92	2.08	0.85	0.96	0.86	0.59	1.69	0.82	0.57
% Contribution Dominant Family	75.56	51.56	69.87	47.16	30.55	48.62	45.23	49.75	61.08	38.38	52.57	61.80
EPT Index	12	12	12	12	15	15	13	13	10	13	16	15
H' Diversity	0.97	1.58	1.24	1.98	2.26	1.69	1.95	1.63	1.47	2.04	1.61	1.56
Hilsenhoff's Biotic Index	5.9	5.7	5.5	4.9	4.4	5.1	5.1	5.5	5.4	4.7	5.4	5.8

Table 3. Community Bioassessment

Metric	STATION REFERENCE	1	2	3	4	5	6
Total Number of Organisms	400.0	785.0	302.0	468.3	475.0	546.0	722.3
Number of Taxa	19.0	24.3	20.0	15.7	20.3	20.7	19.7
Functional Feeding Groups							
Scrapers	288.7	563.7	204.3	359.0	291.7	428.3	508.0
Filterers	32.7	60.0	37.7	25.7	60.3	37.7	57.3
Shredders (CPOM only)							
Scrapers Filterers	10.0	9.1	7.5	25.8	5.2	11.5	9.3
Shredders/Total (CPOM only)							
EPT Abundance	218.3	278.7	180.7	155.0	219.7	222.0	313.3
Chironomid Abundance	182.0	485.3	109.3	309.0	212.7	287.3	386.3
EPT Chironomid	1.4	0.6	9.6	0.5	1.3	0.8	1.0
% Contribution Dominant Taxon	40.2	58.6	48.4	65.7	42.1	52.0	50.2
EPT Index	14.0	15.7	13.0	12.0	14.0	12.0	14.7
H' Diversity	1.9	1.7	1.7	1.3	2.0	1.8	1.8
Hilsenhoff's Biotic Index	4.6	5.2	4.6	5.7	4.8	5.3	5.2
Community Loss Index	NA	0.14	0.35	0.38	0.18	0.29	0.27
Biological Condition Score	38	32	38	28	38	32	34
Biological Condition Category		not impaired	not impaired	slightly impaired	not impaired	not impaired	not impaired

R A W

D A T A

[redacted]

SYMBIOSIS ENVIRONMENTAL

Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC Date of Sampling: ~~5-5-97~~ 5-13-97 Sample ID: REF A

Location: Avtex Number of Stations: 7 Page 1 of 1

Class	Order	Family	Genus	#	
INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	8+1 +1	10
		POTAMANTHIDAE	POTAMANTHUS	29+1	30
		EPHEMERELLIDAE	DRUNELLA	13+1	14
			SERRATELLA	43 +3 +2	+1 49
			EPHEMERELLA	1	1
		HEPTAGENIIDAE	STENONEMA	9+1	10
	PLECOPTERA	PERLIDAE	ECCOPTURA	1	1
			AGNETINA	4+1	5
			PERLESTA	17	
		PERLODIDAE	ISOPERLA	1	1
	EPHEMEROPTERA	BAETIDAE	BAETIS	97 + +	5+1 30 1a
		LEPTOPHLEBIIDAE		1+1	2
		BAETIDAE	ACENTRELLA	15	15
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	5+5 +1	11
		PHRYGANEIDAE	PHYRGANEA	1+2	1mm
	ODONATA	COENAGRIONIDAE	ARGIA	1	1
	COLEOPTERA	ELMIDAE	STENELMIS	8A 1L	+10L 1
	DIPTERA	CHIRONOMIDAE	--	181	181
	TRICHOPTERA	HYDROPTILIDAE	HYDROPTILA	1	1
MOLLUSCA	BIVALVIA	SPHAERIDAE	PISIDIUM	2	2
OLIGOCHAETA				4	4

Taxonomy by: [signature] Date: 8/23/97

NOTE: ~20 GASTROPOD + BIVALVE SHELLS, NO BODIES, NOT KEYED

[redacted]

AR301127

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC Date of Sampling: ~~5-5-97~~ 5-13-97 Sample ID: REF B

Location: Avtex Number of Stations: 7 Page 1 of 1

Class	Order	Family	Genus	#	
INSECTA	PLECOPTERA	PTERONARCYIDAE	PTERONARCYS	2+1	3
	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	10	10
		POTAMANTHIDAE	POTAMANTHUS	6+1	7
		EPHEMERELLIDAE	SERRATELLA	27+2	29
			DRUNELLA	1+1	2
		BAETIDAE	BAETIS	68	68
		HEPTAGENIIDAE	STENONEMA	10	10
		BAETIDAE	ACENTRELLA	5	5
	PLECOPTERA	PERLIDAE	AGNETINA	4	4
			PERLESTA	33	33
	DIPTERA	CHIRONOMIDAE		100	100
OLIGOCHAETA				1	1
MOLLUSCA	BIVALVIA	CORBICULIDAE	CORBICULA	1	1
INSECTA	DIPTERA	SIMULIIDAE	SIMULIUM	1	1
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	4	4
			CHEUMATOPSYCHE	1	1
		PHRYGANEIDAE	PHRYGANEA	1 (imm)	1
	COLEOPTERA	ELMIDAE	STENELMIS	13L 1A	14

Taxonomy by: UlSH Date: 8/23/97

34 GASTROPOD SHELLS, NOT KEYED, NO BODIES

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC Date of Sampling: ~~5-5-97~~ 5-13-97 Sample ID: REF C

Location: Avtex Number of Stations: 7 Page 1 of 1

Class	Order	Family	Genus	#	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	DRUNELLA	3	3
"		ISONYCHIIDAE	ISONYCHIA	11	11
"		POTOMANTHIDAE	POTAMANTHUS	4+1+1	6
		EPHEMERELLIDAE	EPHEMERELLA	5	5
			SERRATELLA	21+1	22
		HEPTAGENIIDAE	STENONEMA	7+1+1 11 +1	11
		BAETIDAE	BAETIS	83+2+1	86
			ACENTRELLA	13+1	14
	PLECOPTERA	PTERONARCIDAE	PTERONARCYS	1	
		PERLIDAE	PERLESTA	16+1	17
			ECCOPTURA	1	1
			AGNETINA	5+1	6
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	1+1	2
	DIPTERA	CHIRONOMIDAE		205	205
		SIMULIIDAE	SIMULIUM	1	1
	MEGALOPTERA	CORYDALIDAE	CORYDALUS	1	1
	COLEOPTERA	ELMIDAE	STENELMIS	8L ~~3+~~5A	13
MOLLUSCA	BIVALVIA	SPHAERIDAE	PISIDIUM	1	1

Taxonomy by: [signature] Date: 8/23/95

2 GASTROPOD, 1 BIVALVE SHELL, NOT KEYED

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC Date of Sampling: ~~5-5-97~~ 5-13-97 Sample ID: 1A

Location: Avtex Number of Stations: 7 Page 1 of 1

Class	Order	Family	Genus	#	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	DRUNELLA	5	5
			SERRATELLA	17+1+1	19
			EPHEMERELLA	4	4
		ISONYCHIIDAE	ISONYCHIA	5	5
		HEPTAGENIIDAE	STENONEMA	11+1+1	13
		BAETIDAE	BAETIS	36+5	41
			ACENTRELLA	12+1+2	15
	PLECOPTERA	PERLODIDAE	ISOPERLA	1	1
	COLEOPTERA	ELMIDAE	STENELMIS	11+4	15
			OPTIOSERVUS	1	1
	PLECOPTERA	PTERONARCIDAE	PTERONARCYS	2	2
		PERLIDAE	PERLESTA	14+1+1	16
			AGNETINA	4	4
	EPHEMEROPTERA	POTOMANTHIDAE	POTAMANTHUS	29+1+1	31
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	6	6
			CHEUMATOPSYCHE	2	2
	ODONATA	GOMPHIDAE	STYLOGOMPHUS	1	1
	DIPTERA	CHIRONOMIDAE	—	256	256
	DIPTERA	EMPIDIDAE	HEMERODROMIA	2	2
	TRICHOPTERA	LEPIDOSTOMATIDAE	LEPIDOSTOMA	1	1

Taxonomy by: [illegible] Date: 8/23/97

[redacted]

AR301130 ✓

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC | Date of Sampling: ~~5-5-97~~ 5-13-97 | Sample ID: 1B

Location: Avtex | Number of Stations: 7 | Page 1 of 2

Class	Order	Family	Genus	#	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS	25	25
		↓	ACENTRELLA	22	22
		EPHEMERELLIDAE	EPHEMERELLA	2+2	4
		↓	SERRATELLA	35	35
		POTOMANTHIDAE	POTAMANTHUS	26+1+1	+1 +1 30
		ISONYCHIIDAE	ISONYCHIA	5	5
		EPHEMERELLIDAE	DRUNELLA	6	6
	↓	HEPTAGENIIDAE	STENONEMA	11+1	12
	PLECOPTERA	PERLIDAE	PERLESTA	34	34
	↓	PTERONARCIDAE	PTERONARCYS	1	1
	MEGALOPTERA	CORYDALIDAE	CORYDALUS	1	1
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	13	13
	↓	↓	CHEUMATOPSYCHE	4	4
	ODONATA	GOMPHIDAE	GOMPHUS	1	1
	TRICHOPTERA	LEPTOCERIDAE	NECTOPSYCHE	1	1
		↓	SETODES	1+1	2
↓	↓	PHRYGANEIDAE	PHRYGANEA	13+1	14
OLIGOCHAETA			--	2	2
MOLLUSCA	GASTROPODA	ANCYLIDAE		1	1
↓	~~BIVAL~~ GASTROPODA	~~LYMNAEIDAE~~ PHYSIDAE		2	2

Taxonomy by WSA Date: 8/23/97

Several empty bivalve shells, not keyed

[redacted]

AR301131

SYMBIOSIS ENVIRONMENTAL

Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC Date of Sampling: ~~5-5-97~~ 5-13-97 Sample ID: 1B

Location: Avtex Number of Stations: 7 Page 2 of 2

Class	Order	Family	Genus	#	
MOLLUSCA	BIVALVIA	CORBICULIIDAE	CORBICULA	3	3
INSECTA	DIPTERA	CHIRONOMIDAE		421	421
		CERATOPOGONIDAE	SPHAEROMIAS	1	1
	TRICHOPTERA	HYDROPTILIDAE	HYDROPTILA	1	1
	COLEOPTERA	ELMIDAE	STENELMIS	24L 1A	25
			MICROCYLLOEPUS	3	3
			MACRONYCHUS	1	1
			DUBIRAPHIA	1	1
			HYDROPHILIDAE	BEROSUS	1	1

Taxonomy by: [illegible signature] Date: 8/23/97

[redacted]

AR301132

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 1C

Location: Avtex   Number of Stations: 7   Page 1 of 2

Class	Order	Family	Genus	#	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	SERRATELLA	97 +3 +2 +2 +1+1 +2	10
			EPHEMERELLA	11+1	12
			DRUNELLA	4+1	5
		ISONYCHIIDAE	ISONYCHIA	8	8
		POTOMANTHIDAE	POTAMANTHUS	34 +1 +1	36
		HEPTAGENIIDAE	STENONEMA	17+4	21
		BAETIDAE	BAETIS	43+3	46
		CAENIDAE	CAENIS	1	1
		BAETIDAE	ACENTRELLA	41+2	3
	PLECOPTERA	PERLIDAE	PERLESTA	75 +1 +1	77
		PTERONARCIDAE	PTERONARCYS	1	1
	TRICHOPTERA	PHRYGANEIDAE	PHRYGANEA	70 +3 +1 +1	75
		HYDROPSYCHIDAE	HYDROPSYCHE	23	23
			CHEUMATOPSYCHE	5	5
		LEPIDOSTOMATIDAE	LEPIDOSTOMA	2	2
		LEPTOCERIDAE	NECTOPSYCHE	2	2
	ODONATA	GOMPHIDAE	STYLOGOMPHUS	2	2
	DIPTERA	CHIRONOMIDAE	—	719	71
		EMPIDIDAE	HEMERODROMIA	1	1
√	COLEOPTERA	ELMIDAE	STENELMIS	41L 1A	4

Taxonomy by: [signature]   Date: 8/24/97

[redacted]

SYMBIOSIS ENVIRONMENTAL

Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 1C

Location: Avtex   Number of Stations: 7   Page 2 of 2

Class	Order	Family	Genus	#	
INSECTA	COLEOPTERA	ELMIDAE	MICROCYLLOEPUS ~~[illegible]~~	2	2
↓	↓	↓	OPTIOSERVUS	1	1
MOLLUSCA	BIVALVIA	CORBICULIDAE	CORBICULA	9	9
↓	GASTROPODA		PHYSIDAE	5	5

Taxonomy by: [signature]   Date: 8/24/97

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC Date of Sampling: 5-13-97 Sample ID: 2A

Location: Avtex Number of Stations: 7 Page 1 of 1

Class	Order	Family	Genus	#	
INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	2	2
		POTOMANTHIDAE	POTAMANTHUS	22 +1	24
		EPHEMERELLIDAE	DRUNELLA	2	2
		HEPTAGENIIDAE	STENONEMA	4+1	5
		BAETIDAE	BAETIS	68+ + 1+1 2+1	73
		↓	ACENTRELLA	1	1
		EPHEMERELLIDAE	SERRATELLA	3	3
	↓	↓	EPHEMERELLA	1	1
	PLECOPTERA	PERLIDAE	~~AGE~~ AGNETINA	4	
		↓	PERLESTA	9	9
	↓	PTERONARCIDAE	PTERONARCYS	1	1
	DIPTERA	CHIRONOMIDAE		95+1+1+1	98
	↓	EMPIDIDAE	HEMERODROMIA	1	1
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	1	1
↓	↓	LEPTOCERIDAE	SETODES	1	1
OLIGOCHAETA				1	1
INSECTA	COLEOPTERA	ELMIDAE	OPTIOSERVUS	2+1	3
↓	↓	↓	STENELMIS	3L 1A	4
MOLLUSCA	BIVALVIA	CORBICULIIDAE	CORBICULA	2	2

Taxonomy by W S Douglas Date: 8/25/97

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 2B

Location: Avtex   Number of Stations: 7   Page 1 of 1

Class	Order	Family	Genus	#	
INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	3	3
		EPHEMERELLIDAE	DRUNELLA	4	4
			EPHEMERELLA	8	8
			SERRATELLA	1+2+3	6
		POTOMANTHIDAE	POTAMANTHUS	11+1	12
		BAETIDAE	BAETIS	10+24+2	36
		HEPTAGENIIDAE	STENONEMA	2	2
	PLECOPTERA	PERLIDAE	PERLESTA	5+7	12
	MEGALOPTERA	CORYDALIDAE	CORYDALUS	1	1
	PLECOPTERA	PERLIDAE	AGNETINA	2	2
		PTERONARCIDAE	PTERONARCYS	1	1
	EPHEMEROPTERA	BAETIDAE	ACENTRELLA	1	1
	DIPTERA	CHIRONOMIDAE		216+2	218
		EMPIDIDAE	HEMERODROMIA	4	4
MOLLUSCA	BIVALVIA	CORBICULIDAE	CORBICULA	1	1
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	4	4
OLIGOCHAETA				1	1
INSECTA	COLEOPTERA	~~EMPIDIDAE~~ ELMIDAE	STENELMIS	4L 1A	5
			OPTIOSERVUS	1	1

Taxonomy by: [illegible]   Date: 8/25/97

~~Dead~~ gastropods + bivalves shells

[redacted]

AR301130

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 2C

Location: Avtex   Number of Stations: 7   Page 1 of 2

Class	Order	Family	Genus	#
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	DRUNELLA	15
			SERRATELLA	42+1 43
		↓	EPHEMERELLA	7
		ISONYCHIIDAE	ISONYCHIA	3
		HEPTAGENIIDAE	STENONEMA	8
		POTOMANTHIDAE	POTAMANTHUS	47
		BAETIDAE	BAETIS	104
	↓	↓	ACENTRELLA	8
	PLECOPTERA	PERLIDAE	PERLESTA	71
		PTERONARCIDAE	PTERONARCYS	2
	↓	PERLIDAE	AGNETINA	3
	TRICHOPTERA	3 HYDROPSYCHIDAE	HYDROPSYCHE	10
		↓	CHEUMATOPSYCHE	2
	↓	UENOIDAE	NEOPHYLAX	1
	ODONATA	GOMPHIDAE	OPHIOGOMPHUS	1
	↓	↓	GOMPHUS	1
	~~TRICHOPTERA~~	MACROMIIDAE	MACROMIA	1
	ISOPODA	ASELLIDAE	CAECIDOTEA	1
	COLEOPTERA	ELMIDAE	STENELMIS	5A
↓	↓	↓	OPTIOSERVUS	1c

Taxonomy by: [illegible]   Date: 8/25/97

[redacted]

AR301137

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 2C

Location: Avtex   Number of Stations: 7   Page 2 of 2

Class	Order	Family	Genus	#
INSECTA	DIPTERA	CHIRONOMIDAE		12
MOLLUSCA	BIVALVIA	CORBICULIIDAE	CORBICULA	2

Taxonomy by: WSD   Date: 8/25/97

Several empty Corbicula shells

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 3A

Location: Avtex   Number of Stations: 7   Page 1 of 1

Class	Order	Family	Genus	#	
MOLLUSCA	BIVALVIA	SPHAERIIDAE	PISIDIUM	1	1
	GASTROPODA	PHYSIDAE		1	1
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS	30+1 +6	37
		POTAMANTHIDAE	POTAMANTHUS	4+1	5
		EPHEMERELLIDAE	DRUNELLA	1	1
			EPHEMERELLA	2	2
		HEPTAGENIIDAE	STENONEMA	1+1	2
		ISONYCHIIDAE	ISONYCHIA	1	1
	PLECOPTERA	PTERONARCIDAE	PTERONARCYS	1	[illegible]
		PERLIDAE	PERLESTA	10+1	11
			AGNETINA	2	2
	TRICHOPTERA	PHRYGANEIDAE	PHRYGANEA	40+9	49
		HYDROPSYCHIDAE	HYDROPSYCHE	1	1
		LEPIDOSTOMATIDAE	LEPIDOSTOMA	2	2
	DIPTERA	CHIRONOMIDAE		368	368
	COLEOPTERA	ELMIDAE	STENELMIS	3	3

Taxonomy by: [illegible]   Date: 8/27/97

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC Date of Sampling: 5-13-97 Sample ID: 3B

Location: Avtex Number of Stations: 7 Page 1 of 1

Class	Order	Family	Genus	#	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS	35+13	48
			ACENTRELLA	2+3	5
		HEPTAGENIIDAE	STENONEMA	11+1 +1	13
		ISONYCHIIDAE	ISONYCHIA	1	1
		EPHEMERELLIDAE	DRUNELLA	1	1
			SERRATELLA	24+1	25
			EPHEMERELLA	2	2
		POTAMANTHIDAE	POTAMANTHUS	13	13
	PLECOPTERA	PERLIDAE	PERLESTA	17	17
	DIPTERA	CHIRONOMIDAE		230 +2	232
	TRICHOPTERA	PHRYGANEIDAE	PHRYGANEA	85	85
	DIPTERA	EMPIDIDAE	HEMERODROMIA	1	1
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	2	2
		LEPTOCERIDAE	SETODES	1	1
	COLEOPTERA	ELMIDAE	STENELMIS	4	4

Taxonomy by: [illegible] Date: 8/27/97

only empty bivalve shells

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC　　Date of Sampling: 5-13-97　　Sample ID: 3C

Location: Avtex　　Number of Stations: 7　　Page 1 of 1

Class	Order	Family	Genus	#	
INSECTA	EPHEMEROPTERA	POTAMANTHIDAE	POTOMANTHUS	40+1	41
		ISONYCHIIDAE	ISONYCHIA	3	3
		HEPTAGENIIDAE	STENONEMA	23	23
		EPHEMERELLIDAE	DRUNELLA	3	3
			SERRATELLA	8+1	9
		BAETIDAE	BAETIS	5+1 +2	8
			ACENTRELLA	1	1
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	4+1 +1 +1+	8
			CHEUMATOPSYCHE	1	
		PHRYGANEIDAE	PHRYGANEA	7+9	16
		LEPTOCERIDAE	OECITIS	2	2
	PLECOPTERA	PERLIDAE	PERLESTA	23	23
	DIPTERA	CHIRONOMIDAE		327	~~237~~
		CERATOPOGONIDAE	PROBEZZIA	1	1
	COLEOPTERA	ELMIDAE	STENELMIS	1	1
			~~DUBIRAPHIA~~ DUBIRAPHIA	1	1

Taxonomy by [signature] Date: 8/28/97

a few gastropod & bivalve shells, empty

[redacted]

AR301141

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 4A

Location: Avtex   Number of Stations: 7   Page 1 of 1

Class	Order	Family	Genus	#	
INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	13½	15
		EPHEMERELLIDAE	DRUNELLA	3	3
		POTAMANTHIDAE	POTAMANTHUS	9+1	10
		HEPTAGENIIDAE	STENONEMA	9	9
			SERRATELLA	22+2+1	25
			EPHEMERELLA	7	7
		BAETIDAE	BAETIS	28+2+2	32
			ACENTRELLA	2+1	3
	PLECOPTERA	PERLIDAE	PERLESTA	34	34
			AGNETINA	2	2
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	3	3
		PHRYGANEIDAE	PHRYGANEA	8+1+1	10
	DIPTERA	CHIRONOMIDAE		164+1+1	166
		SIMULIIDAE	SIMULIUM	3	3
		EMPIDIDAE	HEMERODROMIA	2	2
	COLEOPTERA	ELMIDAE	STENELMIS	4A 20[illegible]	24
			OPTIOSERVUS	3	3
		HYDROPHILIDAE	BEROSUS	1	1

Taxonomy by: WSO   Date: 8/29/97

a few empty bivalve shells

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: ~~4B~~ 4B

Location: Avtex   Number of Stations: 7   Page 1 of 1

Class	Order	Family	Genus	#	
MOLLUSCA	BIVALVIA	CORBICULIDAE	CORBICULA	1	
INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	23	
		POTAMANTHIDAE	POTOMANTHUS	21	
		EPHEMERELLIDAE	DRUNELLA	7	
			SERRATELLA	21	
			EPHEMERELLA	4+1	5
		HEPTAGENIIDAE	STENONEMA	5	
		BAETIDAE	BAETIS	8	
			ACENTRELLA	3	
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	11	
			CHEUMATOPSYCHE	1	
		PHRYGANEIDAE	PHRYGANEA	4+4	8
	PLECOPTERA	PERLIDAE	PERLESTA	54	
		PTERONARCIDAE	PTERONARCYS	1	
		PERLIDAE	AGNETINA	6	
		~~CHLOROP~~ PERLODIDAE	ISOPERLA	1	
	DIPTERA	CHIRONOMIDAE		84	
	COLEOPTERA	ELMIDAE	STENELMIS	8L 4A	12
			OPTIOSERVUS	1	
	ODONATA	GOMPHIDAE	GOMPHUS	2	

Taxonomy by: WBDouglas Date: 8/29/97

A few empty bivalve shells

[redacted]

AR301143

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchshest

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 4C

Location: Avtex   Number of Stations: 7   Page 1 of 2

Class	Order	Family	Genus	#		
OLIGOCHAETA				5+3		8
INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	2+1	+6	9
		POTAMANTHIDAE	POTAMANTHUS	23+1	+31+8	63
		HEPTAGENIIDAE	STENONEMA	18+1	+3	22
		EPHEMERELLIDAE	DRUNELLA	1		1
			EPHEMERELLA	4+12		16
			SERRATELLA	14+	23+2+2	41
		BAETIDAE	BAETIS	4+8	+1	13
	PLECOPTERA	PERLIDAE	PERLESTA	77+	23+3+1	104
		PTERONARCIDAE	PTERONARCYS	3		3
		PERLIDAE	AGNETINA	7		7
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	16+1+1	+1	19
			CHEUMATOPSYCHE	1		1
		UENOIDAE	NEOPHYLAX	1		1
		PHRYGANEIDAE	PHRYGANEA	22+1	+2	25
	MEGALOPTERA	CORYDALIDAE	CORYDALUS	2		2
MOLLUSCA	GASTROPODA	PHYSIDAE	~~PHY~~	2		2
	BIVALVIA	CORBICULIDAE	CORBICULA	1		1
INSECTA	EPHEMEROPTERA	BAETIDAE	ACENTRELLA	1+5		6
	DIPTERA	CHIRONOMIDAE		376	+4+4 +4	388

Taxonomy by: [illegible]   Date: 8/30/97

Several empty bivalve shells

Helicopsyche case [redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC | Date of Sampling: 5-13-97 | Sample ID: 4C

Location: Avtex | Number of Stations: 7 | Page 2 of 2

Class	Order	Family	Genus	#	
INSECTA	COLEOPTERA	ELMIDAE	STENELMIS	63L 1A	64
↓	↓	↓	DUBIRAPHIA	1	1
			OPTIOSERVUS	1	1

Taxonomy by: [signature] Date: 8/30/97

[redacted]

AR301145

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 5A

Location: Avtex   Number of Stations: 7   Page 1 of 2

Class	Order	Family	Genus	#	
OLIGOCHAETA				5+1	6
INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	10+1	11
		HEPTAGENIIDAE	STENONEMA	42+ 1+1 2+1	47
		POTAMANTHIDAE	POTAMANTHUS	16+1	17
		EPHEMERELLIDAE	DRUNELLA	1	1
			SERRATELLA	12	12
			EPHEMERELLA	1+1	2
		BAETIDAE	BAETIS	52+1 +1 +10	64
			ACENTRELLA	4	4
		CAENIDAE	CAENIS	1	1
	PLECOPTERA	PERLIDAE	PERLESTA	17	17
	TRICHOPTERA	PHRYGANEIDAE	PHRYGANEA	9+2 +1	12
		HYDROPSYCHIDAE	HYDROPSYCHE	1+2	3
		LEPTOCERIDAE	NECTOPSYCHE	1	1
	COLEOPTERA	PSEPHENIDAE	PSEPHENUS	2	2
	MEGALOPTERA	CORYDALIDAE	NEOHERMES	1	1
	LEPIDOPTERA			1	1
	DIPTERA	CHIRONOMIDAE	--	198+1	199
		SIMULIIDAE	SIMULIUM	2	2
	COLEOPTERA	ELMIDAE	STENELMIS	31	31

Taxonomy by: 8/31/97 Date: [illegible]

[redacted]

AR301146

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 5A

Location: Avtex   Number of Stations: 7   Page 2 of 2

Class	Order	Family	Genus	#
INSECTA	ODONATA	GOMPHIDAE	GOMPHUS	3
MOLLUSCA	GASTROPODA	PHYSIDAE		3

Taxonomy by: [illegible] Date: 8/31/97

1 empty Corbicula shell

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC Date of Sampling: 5-13-97 Sample ID: 5B

Location: Avtex Number of Stations: 7 Page 1 of 2

Class	Order	Family	Genus	#	
MOLLUSCA	GASTROPODA	PHYSIDAE		3	3
↓	BIVALVIA	CORBICULIDAE	CORBICULA	2	2
INSECTA	PLECOPTERA	PERLIDAE	PERLESTA	4+2 +4	10
	↓	↓	ECCOPTURA	1	1
	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	10	10
		POTAMANTHIDAE	POTAMANTHUS	16+1	17
		EPHEMERELLIDAE	DRUNELLA	1	1
			SERRATELLA	10+4	14
		↓	EPHEMERELLA	1	1
		CAENIDAE	CAENIS	1	1
		HEPTAGENIIDAE	STENONEMA	50	50
		BAETIDAE	BAETIS	61 +1 +1 +5	68
	↓	↓	ACENTRELLA	12+3	15
	TRICHOPTERA	PHRYGANEIDAE	PHRYGANEA	65 +5 +1	71
	↓	HYDROPSYCHIDAE	HYDROPSYCHE	1+1	2
↓	DIPTERA	CHIRONOMIDAE		299+1 +2	302
OLIGOCHAETA				2+4	6
INSECTA	DIPTERA	SIMULIIDAE	SIMULIUM	2	2
	↓	EMPIDIDAE	HEMERODROMIA	1	1
↓	LEPIDOPTERA			2	2

Taxonomy by: W S Douglas Date: 8/31/97

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 5B

Location: Avtex   Number of Stations: 7   Page 2 of 2

Class	Order	Family	Genus	#	
INSECTA	COLEOPTERA	ELMIDAE	DUBIRAPHIA	1	1
↓			STENELMIS	2A 23L	25
	ODONATA	GOMPHIDAE	GOMPHUS	1	1
	COLEOPTERA	HYDROPHILIDAE	BEROSUS	1	1

Taxonomy by: W. S. Douglas Date: 8/31/97

[redacted]

AR301149

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC Date of Sampling: 5-13-97 Sample ID: 5C

Location: Avtex Number of Stations: 7 Page 1 of 1

Class	Order	Family	Genus	#	
MOLLUSCA	GASTROPODA	PHYSIDAE		2	2
OLIGOCHAETA				1	1
MOLLUSCA	BIVALVIA	CORBICULIDAE	CORBICULA	4	4
INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	5+1	6
		POTAMANTHIDAE	POTAMANTHUS	34+1+1	36
		HEPTAGENIIDAE	STENONEMA	34+1	35
		BAETIDAE	BAETIS	73+1+1	75
			ACENTRELLA	9+1	10
		EPHEMERELLIDAE	SERRATELLA	13	13
			EPHEMERELLA	1	1
	PLECOPTERA	PERLIDAE	PERLESTA	19	19
		PTERONARCIDAE	PTERONARCYS	1	1
	TRICHOPTERA	PHRYGANEIDAE	PHRYGANEA	14+3	17
	DIPTERA	CHIRONOMIDAE		361	361
	COLEOPTERA	ELMIDAE	STENELMIS	4L 5A	9
	DIPTERA	SIMULIIDAE	SIMULIUM	1	1

Taxonomy by: [illegible signature] Date: 8/31/97

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC — Date of Sampling: 5-13-97 — Sample ID: 6A

Location: Avtex — Number of Stations: 7 — Page 1 of 1

Class	Order	Family	Genus	#	
OLIGOCHAETA				1	1
INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	21+ 3 4	28
		POTAMANTHIDAE	POTOMANTHUS	18+8	26
		HEPTAGENIIDAE	STENONEMA	22+6+1	29
		EPHEMERELLIDAE	DRUNELLA	5	5
			SERRATELLA	23+2	25
			EPHEMERELLA	1	1
		BAETIDAE	BAETIS	85+1+1	87
			ACENTRELLA	6+1	7
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	3	3
		PHRYGANEIDAE	PHRYGANEA	18+1	19
		LEPTOCERIDAE	NECTOPSYCHE	1	1
	PLECOPTERA	PERLIDAE	PERLESTA	31+1	32
			AGNETINA	7	7
	DIPTERA	CHIRONOMIDAE		160	160
	COLEOPTERA	ELMIDAE	STENELMIS	5A 4L	9

Taxonomy by: [signature] Date: 8/31/97

[redacted]

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC Date of Sampling: 5-13-97 Sample ID: 6B

Location: Avtex Number of Stations: 7 Page 1 of 2

Class	Order	Family	Genus	#	
MOLLUSCA	BIVALVIA	CORBICULIDAE	CORBICULA	2	2
↓	GASTROPODA	PHYSIDAE		2	2
↓	↓	LYMNAEIDAE		1	1
OLIGOCHAETA				4	4
INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	ISONYCHIA	5+3+3	11
		POTAMANTHIDAE	POTAMANTHUS	44+1+2+1	48
		HEPTAGENIIDAE	STENONEMA	49+2	51
		EPHEMERELLIDAE	DRUNELLA	2	2
			SERRATELLA	29+9+1	39
		↓	EPHEMERELLA	3+1	4
		CAENIDAE	CAENIS	1	1
		BAETIDAE	BAETIS	34+3	37
	↓	↓	ACENTRELLA	9	9
	~~TRICHOPTERA~~ PLECOPTERA	PERLIDAE	PERLESTA	27+1	28
		PTERONARCIDAE	PTERONARCYS	3	3
	↓	PERLIDAE	AGNETINA	3	3
	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	6+1	7
		PHRYGANEIDAE	PHRYGANEA	68+7	75
		LEPIDOSTOMATIDAE	LEPIDOSTOMA	1	1
↓	↓	LEPTOCERIDAE	SETODES	1	1

Taxonomy by: WSDouglas Date: 8/31/97

2 empty Corbicula shells

[redacted]

AR301152 √

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 6B

Location: Avtex   Number of Stations: 7   Page 2 of 2

Class	Order	Family	Genus	#	
INSECTA	DIPTERA	CHIRONOMIDAE		389	389
↓	COLEOPTERA	ELMIDAE	STENELMIS	11A 11L	22

Taxonomy by: W S Douglas Date: 8/31/97

[redacted]

AR301153

SYMBIOSIS ENVIRONMENTAL
Benthic Taxonomy Assessment Benchsheet

Client: Weston REAC   Date of Sampling: 5-13-97   Sample ID: 6C

Location: Avtex   Number of Stations: 7   Page 1 of 1

Class	Order	Family	Genus	#		
MOLLUSCA	GASTROPODA	PHYSIDAE	~~PHYS~~	7		7
	BIVALVIA	CORBICULIIDAE	CORBICULA	1		1
INSECTA	PLECOPTERA	PERLIDAE	PERLESTA	23+	1 9+1	34
		↓	AGNETINA	6		6
	↓	PTERONARCIDAE	PTERONARCYS	1		1
	EPHEMEROPTERA	POTAMANTHIDAE	POTOMANTHUS	28+	1 4	33
		ISONYCHIIDAE	ISONYCHIA	3		3
		EPHEMERELLIDAE	DRUNELLA	8+1		9
		HEPTAGENIIDAE	STENONEMA	14+1+9	+1 +1	26
		EPHEMERELLIDAE	SERRATELLA	35+	1+1	37
		↓	EPHEMERELLA	7		7
		BAETIDAE	BAETIS	38+	1 8	47
	↓	↓	ACENTRELLA	23+	8	31
	TRICHOPTERA	~~FRI~~ HYDROPSYCHIDAE	HYDROPSYCHE	8+1		9
	MEGALOPTERA	CORYDALIDAE	CORYDALUS	1		1
	TRICHOPTERA	PHRYGANEIDAE	PHRYGANEA	105		105
		HYDROPSYCHIDAE	CHEUMATOPSYCHE	1		1
	↓	LEPTOCERIDAE	NECTOPSYCHE	1		1
	DIPTERA	CHIRONOMIDAE		610		610
	COLEOPTERA	ELMIDAE	STENELMIS	11L+1 2A		16
↓			OPTIOSERVUS	1+1		2

Taxonomy by: H. C. Douglas Date: 8/31/97

Several empty Corbicula shells

2 Helicopsyche shells

[redacted]

AR301154

REAC, Edison, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: Avtex
Project Number: 23347-142-001-2215-01
RFW Contact: Mark Huston Phone: 321-4200

No: 05353

SHEET NO. 1 OF 1

Sample Identification							Analyses Requested			
REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Tax. ID			
	Ref A	Ref A	X	5-13-97	8	40ml / 2-propanol	X			
	Ref B	Ref B			6					
	Ref C	Ref C			9					
	1A	1A			4					
	1B	1B			8					
	1C	1C			8					
	2A	2A			10					
	2B	2B			11					
	2C	2C			7					
	3A	3A			7					
	3B	3B			8					
	3C	3C			7					
	4A	4A			11					
	4B	4B			8					
	4C	4C			15					
	5A	5A			9					
	5B	5B			9					
	5C	5C			8					
	6A	6A			7					
	6B	6B			9					
	6C	6C	X	X	7	X	X			

Matrix:
SD - Sediment
DS - Drum Solids
DL - Drum Liquids
X - Other
PW - Potable Water
GW - Groundwater
SW - Surface Water
SL - Sludge
S - Soil
W - Water
O - Oil
A - Air

Special Instructions:
X - Benthic macroinvertebrates

FOR SUBCONTRACTING USE ONLY

FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
All / Identification	Jennifer Royce	8/13/97	[illegible]	8/13/97	5:45 pm						

FORM #4